

THE FAR EASTERN

REVIEW

FOUNDED BY GEORGE BRONSON REA
35TH YEAR OF PUBLICATION



上海黃浦灘金四號

遠東時報

WHY CHINA'S WAR GOES ON

HOW DUTIES MAY AFFECT PHILIPPINE
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FAR EASTERN CROSS-CURRENTS

Coal and Iron Line

Designed to tap the rich coal fields of Tatung and the iron mines of Suanhua in North China, a special rail line may be built from Tangku westward if plans of the Japanese Railway Ministry and the North China Railway Company materialize. This railway would speed up the transportation of coal and iron ore to Japan proper.

Extending from Tangku to Suanhua, south of Kalgan in Chahar province, the projected railway would be almost parallel to the existing Peiping-Mukden and Peiping-Suiyuan lines. If construction is undertaken this year, the line may be completed by the end of 1940, engineers here said.

The line, if completed, would form a link in a proposed "anti-Comintern" Tokyo-to-Berlin railway of a total length of 15,000 kilometers. The distance from Tangku to Tatung is 570 kilometers. The Tokyo-Berlin route, as envisaged by the Japanese Ministry of Railways, would extend from Japan to Korea, thence to North China, to the Pamir Plateau, to Kabul, in Afghanistan and to Baghdad.

This would be virtually the route followed in the opposite direction by Marco Polo when he visited China.



Foresee New Trade Treaty

Diplomatic quarters at Washington believed that renewed evidence of Japan's determination to maintain her neutrality in the European war foreshadowed early Japanese moves to negotiate a new trade treaty with the United States. The Japanese, it is believed, are seeking to reap all the possible commercial benefits of neutrality, including increased trade with South America.

There has been a considerable increase in Japanese purchases from South America, it was pointed out, and it is believed Japan will make a determined effort here to control trade which formerly went to Germany, Britain and France. A lesser but appreciable increase in South American purchases of Japanese light manufactured goods also was reported.

Informed quarters said as yet there had been no official Japanese approaches to the United States for the drafting of a new trade treaty to replace the treaty of 1911 which the United States recently abrogated.

Such an approach is not expected before the realignment of the world Powers is further clarified but it is believed most likely that such negotiations will soon be initiated by Japan if it is indicated that both the United States and Japan are committed to maintaining their neutrality.

However, diplomatic quarters believe that there would be a mutual advantage if the United States were to continue normal commercial relations with Japan, particularly since the European war has affected other markets adversely. But the continuance of Japanese economy on a war basis with wartime restrictions on exchange and imports, fails to remove the underlying economic reason why the Secretary of State, Mr. Cordell Hull, denounced the 1911 Japanese-American pact.

Consequently it is believed that the question of actual negotiations will be determined largely by whether the Sino-Japanese war can be concluded or a truce secured and whether Japan will be able to relax her restrictions against United States business.

Japan's Position

The recent formation of a new Cabinet in Japan, shortly before the commencement of the European war, says the *North-China Daily News* of Shanghai, was the last major occurrence in politics in the Far East, and, even though the amorphous political situation in the west has now crystallized into actual hostilities, it still remains to be seen what attitude towards them will be adopted by the Japanese Government. Of its intention to do its utmost to bring the China Incident to an end there cannot be the slightest doubt; the new Prime Minister and his associates have made that quite clear in their various declarations. If it is ultimately found that at any rate for the time being Japan prefers to concentrate all her energy upon bringing about a peaceful solution of the dispute with China it will merely prove that she has accepted the best counsels in view of all the circumstances.

Rumors current to the effect that she might contemplate entering into the four power axis which was alleged in certain European papers have, in all probability, no foundation in fact. It is clearly not the best policy for her to commit herself to one side or the other, while the observance of neutrality in the European conflict, and the avoidance of any entanglements whatsoever provide her with the best possible means of achieving her immediate ambition.

On the other hand departure from complete neutrality in the European conflict would be unwise from a purely economic point of view. She, as well as others who remain neutral, has the chance of doing a greater export trade than has been the case since the last war, and it is possible, in the event of a long struggle,—and no one in their proper senses can believe that it will be a short one,—she stands a good chance of recouping by peaceful means much of the expense to which she has been put in China and Manchoukuo.

Departure from neutrality means that her already diminished export trade would suffer severe blows, while entrance into the rumored four Power axis would almost inevitably lead to a world war in which Japan's export trade would be completely ruined. If at any time such an issue were raised by the creation of such an axis then there would be a straight conflict between that organization and the democracies, something which would without doubt range the United States on the side of the latter.

Viewed in that light the settlement of the China issue, not only with China herself, but with the third party Powers having interests in this part of the world may quite correctly be regarded as Japan's essential preoccupation. At the moment Great Britain is most closely concerned in this aspect of the matter, for, though under the Cabinet of Baron Hiranuma the Anglo-Japanese negotiations at Tokyo came to a breakdown, it is possible that under General Abe's administration they may be revived. That at any rate is the wish of the British Government, and in the House of Commons Mr. R. A. Butler, Parliamentary Under-Secretary for Foreign Affairs, made that quite plain when he stated unequivocally "His Majesty's Government has made it clear that it is not only willing, but anxious to continue conversations in the hope that an agreement may yet be reached on all outstanding points." It is very obviously to the advantage of all concerned that some agreement regarding the points at issue between Great Britain and Japan should be further examined in the hope that there can be some sort of settlement.

Denial at Tokyo

German reports that said the Premier, General Nobuyuki Abe, had told the press that Japan was revising her relations with the Soviet Union at the suggestion of Herr Joachim von Ribbentrop, German Foreign Minister, were categorically denied by Japanese official quarters on September 11.

A flat denial was given by the same circles to the German report that the Premier said he favored a non-aggression pact with the Soviets.

The Premier, they pointed out, in his interview with the press intimated the impossibility of reconciling Japan's position with the Reich Foreign Minister's contention that "there is no inconsistency or contradiction in adhering to the anti-Comintern pact and the same time concluding a non-aggression pact with the Soviet Government" which, in reality, is the counterpart of the Comintern.

Regarding the readjustment of the Manchoukuo-Mongol border situation, the Premier pointed out that it was not up to Japan to take the initiative in this matter, Japanese officials said.

They further said that the Premier thus signified that the Soviet Union was entirely to blame for the frontier incidents.—United Press.



Soviet Russia Mobilizes

Owing to the increasingly extensive and threatening war between Germany and Poland, the Soviet Government has decided to call certain classes to the colors as a precautionary measure, the official Tass news agency stated on September 10. Reservists are being called up, the agency added, in Ukraine, White Russia, and the military districts of Leningrad, Moscow, Kalinin and Orel.

Mobilization in Soviet Russia gained momentum as, beside calling up Reserves, the Government summoned technicians up to the 45-years age limit. Chauffeurs, mechanics, electricians and other experts are included in this category.

Youngsters of seventeen years of age who have concluded their secondary school education were also called up for service though according to the Military Law lately voted by the Supreme Soviet, they should have been called only on September 15.

The Railways Theater, near Leningrad Station, has been transformed into a mobilization center.

Recruits are already in uniform. Horses requisitioned in the countryside are already leaving the center of the city for the suburban riverfront.

It was confirmed that the mobilization extends to expert and non-specialist classes in all the armed services. Several schools have been transformed into mobilization centers, guarded by sentinels with fixed bayonets.



Treaty Question Interests Canada

Fear that Britain may follow the United States' example and denounce her trade agreement with Japan was expressed in Canadian *Big Business* quarters recently. For the balance of trade between Canada and Japan heavily favors the Dominion, and strong British action may hurt Canadian-Japanese commerce.

Washington's notice of denunciation of the 1911 treaty of commerce and navigation found hearty approval in the press, but industrial and big business interests viewed it with alarm.

If Anglo-Japanese negotiations in Tokyo were to fail, they indicated, Britain might follow in the footsteps of her "cousin across the seas." And Japanese retaliation would not be out of the question.

During the past three years, Canada exported \$80,000,000 worth of goods, mostly metals for armaments plants, to Japan, and imported only \$25,000,000 worth of Japanese products. The commercial balance therefore greatly favored the Dominion, whose Government has steadfastly refused to prohibit the export of raw materials to Japan in spite of pressure exerted by antagonistic public opinion.

The Government's chief argument to date was that it would be useless to restrict exports of this nature as long as other countries continued to trade freely with Japan.

But, as the *Montreal Gazette* declared, if Great Britain were to denounce her 1911 trade treaty with Japan, Canadian-Japanese commercial relations would almost automatically be ruptured.

Far Eastern Policy of France

A change in France's Far Eastern policy was demanded by *Le Matin* in a recent editorial, according to *Transocean*.

The paper declared that France and Britain had "sabotaged natural developments in the Far East by their indirect support of the Chiang Kai-shek regime," and that since the Kuomintang had practically lost the war with Japan from a military point of view, the French Government should accept this situation and change its policy accordingly.

France, the paper said, need not be afraid of Japan's claims in China, since China is large enough to provide room also for other nations, and because Japan is prudent enough not to provoke the European nations to a point at which they would form a coalition against her.



Pacific Defence of U.S.

The United States Navy is apparently concentrating on strengthening its Pacific defence in order to enforce American neutrality.

It was reported on September 9 that the Navy plans to fly 12 twin-engined patrol bombers to Manila to serve with the sea-plane tender, U.S.S. *Langley*, which recently left Honolulu for the Philippines. It was reported that the *Langley* carried no planes when it left port.

Navy Officials refused to comment on the possibility of the planes being flown to the Philippines.

A Navy spokesman said the Asiatic Fleet's submarine strength would be increased by twelve. Although there are at present six submarines at Manila, the Navy eventually hopes to replace those over-age vessels with new ones.

He pointed out, however, that the Navy did not plan the immediate withdrawal of all those submarines in the Asiatic squadron which are over-age.

The spokesman said that all submarines now in Oriental waters would be used to enforce American neutrality at the entrance of Manila Bay and other points.—United Press.



Japan May Buy Ships

The Norddeutscher Lloyd and the Hamburg-Amerika lines may offer for sale to Japan their half a dozen ships now taking refuge in Japanese ports, it is believed, says the *Asahi*. And in case the offer is actually made, it is further considered very likely that the Finance and Communications Ministries will grant the necessary permission for their purchase. Their sales contracts may even have provisions for their repurchase later should the companies so desire, it is said.

The total tonnage of these half a dozen ships in Japanese harbors is calculated to be about 60,000 tons. The total tonnage of German ships in the Far East is estimated to be about 200,000 tons. The list of German ships here is headed by the *Scharnhorst*, 18,000 tons, now in Kobe. The Hamburg-Amerika Line's 7,363-ton *Kulmerland* and the *Bergenland* are also anchored in Kobe. The Norddeutscher Lloyd's 8,067-ton *Regensland* and the 9,179-ton *Elbe*, both freighters, are in Yokohama. The freighter, *Muensterland*, 6,408 tons, of the Hamburg-Amerika line is thought to be in Keelung, Formosa.

It is reported that the 45 members of the crew on the *Bergenland* have left for Moscow via the Trans-Siberian Railway. They are expected to go to Norway, from where they will sail for their fatherland. *Domei* reports that when the *Regensburg* returned from Keelung, Formosa, after leaving Yokohama on August 8, there were on board some 130 Chinese coolies who apparently were taken on since the boat left Japan about a month ago. Following investigations by the Yokohama water police, it was found out that the ship had been ordered to take on some Chinese laborers aboard to help fill a shortage of hands. Captain K. Harder and 56 members of his crew are said to be preparing to leave for Germany by way of Siberia at a minute's notice.

The Peninsula and Oriental Steam Navigation Company's Far Eastern passenger liner, *Rajputana*, 16,644 tons, which was scheduled to leave for Europe from Yokohama has been ordered to sail directly for Canada, *Domei* reports. It will be used as a military transport.

Soviet Far Eastern Armies Reinforced

Havas reported from Moscow, on August 15, that travellers from the Far East asserted that Soviet Russia east of the Ural Mountains was being transformed into a vast armed camp.

The Soviet Government has sent considerable reinforcements to Siberia. It is understood that these new troops are to stay garrisoned over that territory. Travellers declared that they had seen great troop movements before they had reached Sverdlovsk on the eastern border of central Russia.

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New Rolling Mills for Japan

Two of Japan's leading steel companies will construct two new rolling mills to be equipped with American machines, worth almost Y18,000,000, says the *Japan Times*.

These schemes follow the agreement between the United Engineering and Foundry Works of Pittsburgh and the Shibaura Engineering Works of Tokyo for the establishment of a company for the manufacture of rolling mill machinery.

The Japan Iron and Steel Manufacturing Company will start construction of a Y10,000,000 strip steel mill towards the end of this year. The output is expected to amount to 500,000 tons of 80-in. wide sheets of strip steel.

A contract has been placed with the United Engineering and Foundry Works for \$4,000,000 worth of strip mill equipment, and an engineer of the Japan Iron and Steel Manufacturing Company left for Pittsburgh early this month in order to discuss technical details.

The new plant is to be set up at Hirohita, near Kobe, and is planned to be completed by the end of next year. The order for the machinery was placed through the Mitsui Bussan Kaisha, representative in Japan of the United Engineering and Foundry Works.

About the beginning of August, the Nippon Kinzoku Kaisha will begin the construction of a Y5,000,000 rolling mill, which is scheduled to turn out 10,000 tons of sheet steel annually. The Nippon Kinzoku Kabushiki Kaisha has purchased about Y3,000,000 worth of rolling mill equipment from the United Engineering and Foundry Works, and motors and electric equipment from the General Electric Company.

The new mill will be located at Kawasaki and will be engaged in the rolling of steel ingots into flat sheets of about eight by ten feet in size to be sold to chemical firms and arms manufactories.

Two American engineers arrived in Japan aboard the *Kamakura Maru* on July 12 for a six-month stay in order to supervise the installation of the American plant and the training of the Japanese workers.

The Nippon Kinzoku Kabushiki Kaisha, which is building the Kawasaki plant, is jointly owned by the Mitsui, the Sumitomo, and the Furukawa interests and is Japan's leading manufacturer of stainless steel.

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Currency and Prices in Japan

There has been a progressive increase in the amount of paper money in circulation in Japan in recent years.

Notes in circulation averaged Y2,286,000,000 in July, representing an increase of Y280,000,000, compared with July, 1938, and an increase of Y814,000,000 compared with the corresponding period in 1937, when the "China Incident" broke out.

The average annual increase in note issue before the outbreak of the "Incident" was around Y100,000,000.

The huge increase in note circulation would not be dangerous if paralleled by an expansion of Japan's economic activity says the *Asahi*, "but, unfortunately, this does not seem to be the case."

Industrial expansion, it says, must necessarily be followed by an increase in nation's power of absorbing bonds held by financing institutions and the general public.

The amount of bonds now in the vaults of the Bank of Japan, the *Asahi* adds, suggests that any substantial expansion in the nation's economic activity has yet to come.

To maintain the same living standard as existed in Japan before the outbreak of the Sino-Japanese hostilities, both office workers and the laboring classes should receive an increase of some 20 per cent in their monthly incomes, according to statistics released by the Statistical Bureau of the Japanese Government.

If July, 1937, is taken as 100, the average index of living expenses of office workers in 24 leading cities in Japan in July this year stood at 119.7.

The index of living expenses for the working class shows a rise of 20.8 per cent compared with that in July, 1937.

Industrial unrest has increased considerably this year, as evidenced by numerous strikes, despite the fact that labor has been placed under strict Government control through invocation of the National General Mobilization Law.

Among the main factors creating a situation likely to cause much trouble in the future are:—

- (1) Big firms are taking a larger and larger part in the huge industrial expansion in Japan resulting from the hostilities in China and
- (2) Small and medium-sized concerns are being driven out of business owing to the greater difficulty they experience in raising new capital.

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The Philippines

The question of Philippine independence in 1946 rests entirely with the Filipinos, Mr. Francis B. Sayre, new U.S. High Commissioner for the Philippines, said in Washington on August 1 in his first press conference since assuming his new Manila post.

He said the question of rescinding Philippine independence was "not before the United States, notwithstanding the events and changed conditions in the Far East."

He said the matter of independence, as far as the United States is concerned, is settled by the Tydings-McDuffie Independence Act unless the Filipino people request that independence be delayed or definitely cancelled.

Mr. Sayre said his administration would be based on the supposition that the Philippines would become independent in 1946. He indicated he was mainly interested with economic problems incident to Philippine independence.

Mr. Sayre, who is former Assistant Secretary of State, declined to state his views on the possibility of a trade pact between Japan and the Philippines or Japan and the United States covering the Philippines.

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Japanese Fishery

Japanese fisheries expansion to the South China sea is being challenged by Great Britain, France and the Netherlands. Mr. David S. Waite, United Press Staff correspondent, wrote from Singapore on August 8.

The colonial Governments of these three powers are all assisting in the development of native fishing industries with a view to preventing the Japanese from gaining ascendancy.

In Malaya, a fishing instruction center for Malays is being established in the disused powder magazine on the east coast of Singapore Island. Malays and Chinese are being helped to adopt modern methods of fishing and marketing their catch.

The fishing licenses of more than 500 Japanese have been revoked. The Japanese fishermen have left for Hainan Island and the east coast of Malaya where they are working on Japanese-owned iron ore mines.

In Netherlands Indies, the Government is teaching Javanese fishermen to adopt Japanese diving methods, and other measures are being taken to increase the catch of native fishermen.

When the Singapore fish market was virtually closed to Japanese, as a result of the Chinese boycott of Japanese goods and Japanese agents, many of the unemployed fishermen moved to Java and marketed their catches in Netherlands Indies towns.

The Netherlands Government would prefer the natives to benefit from the big demand for fish by the 40,000,000 population of Java.

In French Indo-China, a fishery research trawler, *De Lanessan*, attached to the Institute of Oceanography, Saigon, is carrying out research work with a view to helping the native fishing industry.

The trawler is now on an official tour of Netherlands and British ports in Netherlands Indies and Malaya, making contacts with the fisheries departments of the two countries concerned.

During the vessel's visit to Java, officials are studying the marketing of Indo-China's big export of dry and fresh fish. From the great lakes of Cambodia (Indo-China), 25,000 tons of dried fish, equal to 100,000 tons of fresh fish, is exported annually to the Dutch colony. Most of it goes via Singapore.

About 6,000 tons of fish are caught off the coast of Indo-China annually for export to Netherlands Indies, in addition to fish caught for domestic consumption.

Japan's China Policy

It was announced at Tokyo that the Government is preparing to issue a statement regarding Japan's attitude toward a new central Government in China which was expected to be established in the near future. The statement would pledge Japan's co-operation with the new regime and announce the Government's intention to readjust Sino-Japanese relations, the *Nichi-Nichi* said. Preparations were said to have been completed for extending formal recognition to the new Government on its inauguration and for concluding various agreements with it to regulate Sino-Japanese relations, the paper stated.

The matter was being carefully studied by the Foreign Office and the Asia Development Board, according to the journal, which predicted that a "new relationship of mutual help and inter-dependence will be established between Japan, Manchoukuo and China, while the Chungking regime will be regarded as a provincial administration by Japan and the new central Government, which will jointly undertake a punitive expedition against it."

Nanking would be chosen as the seat of the new Government, according to the daily.

Japan's most important task at present was to adjust administrative and economic control policies for the primary purpose of bringing about a settlement of the China conflict, Premier General Nobuyuki Abe told reporters.

Concrete measures were under study and would be enforced immediately, the Premier said. He emphasized that Japan's fundamental policies were immutable. He recalled that Japan has announced her intention not to meddle in the European war. Japan should not be influenced by the ever changing foreign situation, he said.

Japan had notified the belligerent countries of her non-intervention policy because she wanted to prevent untoward incidents in Japanese-occupied areas in China and thus avoid a "forced intervention" in the war, the Premier concluded.—Domei.



It is estimated that more than \$2,000,000 worth of radium-uranium and copper-silver concentrates will be shipped out this summer from Canada's radium mines on Great Bear Lake in the sub-Arctic. This, it is stated, will be the largest movement of partially-processed radium in history.

To help in the moving of this quantity of concentrates, two small vessels are now being built in Eastern Canadian shipyards. They will be shipped approximately 2,000 miles by rail and will be equipped with their Diesel engines at Waterways, north of Edmonton. The two new vessels which will be only 60 feet in length will be christened Radium Express and Radium Cruiser. They will be added to the radium carrying fleet which now includes the Radium King and Radium Queen.

These radium ships will operate over 2,500 miles of fresh water routes in the sub-Arctic and Arctic. Formerly radium ores were shipped from Eldorado mines by air, but at the present time practically all the rich radium-uranium concentrates are carried south by these little ships.



It is reported that, for the purpose of facilitating importation of necessary materials into Inner Mongolia and the export of furs, the present Inner Mongolia Company which was inaugurated on August 1 last year, with a capitalization of Y1,000,000 fully paid up, will be reorganized with a capitalization of Y10,000,000.

Another plan to organize an Inner Mongolia Trading Company for the sole purpose of handling the importation of coal and other industrial raw materials and distribution thereof is reportedly afoot.

It is said that, upon the formation of this company, which is expected to be in July, the present China Development Company (The Kochu Koshi) which is at present solely importing these raw materials, will be dissolved.

The "Industrial Bank of South Chahar" which was established in March last year for the purpose of extending financial accommodations to medium and small scale businessmen and industrialists, is now reported to be making steady progress.

The total amount of deposits in the bank and the total amount of loans at the end of May this year are reported to have reached Y3,360,000 and Y4,670,000 respectively. The total amount of

profit realized by the bank is said to be approximately Y50,000 or Y60,000 in round figures so far, and at the end of June the bank is expected to be able to pay a dividend of Y50,000.

The domestic exchange brokers who were merged into this bank and who at first entertained some anxiety as to the success of the bank are said to be very pleased with this fair result.

Through its loans to farmers and medium and small scale businessmen and industrialists in Inner Mongolia, the bank is said to have contributed greatly towards their relief and rehabilitation.



Soviet Russia is rapidly losing its economic and political foothold in Iran where a rejuvenated nationalism is sweeping the country, Mr. Takeo Okubo, chief of the International Affairs Section of the Aviation Bureau, told reporters in Tokyo recently. Mr. Okubo returned to Japan after an absence of 40 days spent on a 24,180-kilometer round trip to Teheran in the Japanese good-will aeroplane Soyokaze which carried an Imperial wedding gift to the Crown Prince of Iran. The plane's crew was royally feted during a month's stay in the Iranian capital, Mr. Okubo said.

A trade treaty between Soviet Russia and Iran was recently denounced, Mr. Okubo said. Efforts to conclude another treaty were made by the Moscow authorities by dispatching a high-ranking representative to the celebrations in connection with the wedding of the Iranian Crown Prince, but "appeared" to have failed.

Previous to the "rise of Germany and Italy," Mr. Okubo continued, Russia ranked first in Iran's foreign trade, followed by Britain and France. These nations, however, were now falling back, he said.

Japan, together with Italy and Germany, were now making rapid progress in the economic field in Iran, according to Mr. Okubo.

Iran now had an army of 300,000 men comprising 15 well-equipped divisions, the Japanese official stated. The flight of the Soyokaze, Mr. Okubo declared, was significant in that it showed to 400,000,000 Mohammedans that Japan still had a reserve of strength in the present conflict.

High praise was given the Soyokaze, an all-Japanese built monoplane powered with two 900-horse-power Mitsubishi radial air cooled engines, by Iranian officials, Mr. Okubo declared.



Highways to Tibet

The Chinese Government is pushing the construction of new highways linking Sikang, the newly-created province between Szechuan and Tibet, with Calcutta, and Sining (in Kokonor Province).

This information was supplied to Reuter on August 8 by Mr. Hsi Lun, member of a special Economic Investigation Mission sent to Sikang under the auspices of the People's Political Council.

Mr. Hsi states that the entire highway between Chungking and Kwangtung (Tachienlu) will be completed by next spring.

He estimates that 130,000 laborers are working on the new road; and he declares that no less than 2,000 of these have sacrificed their lives in attempts to carry the road over the difficult pass through the Erhlanshan Mountains.

Hitherto, he states, despite the huge toll, the pass remains unconquered.



Compensation to Chungking Officials

In view of the frequent air raids which expose members of the Government staff and first aid workers to injury, death or loss of possessions, the Chinese Government has promulgated elaborate regulations designed to protect their interests, Reuter reported from Chungking on August 11.

Under the new regulations, free medical treatment will be provided for the wounded, or subsidies will be paid towards medical expenses or burial expenses. Pensions will be paid to families of the dead and compensation will also be paid for property losses.

The subsidies, pensions and compensations for low-salaried officials are extremely liberal as compared to those of higher-salaried officials.

All Government offices have been advised to take out group insurance policies covering accidents, for the staff. The Government will subsidize the policies of those receiving low salaries.

Why the War in China Goes On

By C. J. LAVAL

Lall the elements of the tragic situation in China are balanced, and if past causes and present-day effects are studied thoughtfully, one single reason only emerges why hostilities in China are being continued, and this is an external cause from which can flow no possible benefit for either of the principals engaged in the warfare. If these hostilities should be terminated immediately in favor of Japan, and in accord with all Japanese aims, the Tokyo Government at once would be confronted with a reckoning of loss, in lives and in treasure, of such magnitude that it would be hopeless to believe they might be repaired, even under most favorable circumstances, in a period of less than a half century. China lies prostrate with her resources nearing the vanishing point as daily her currency falls to lower levels of value, with her customs houses and other revenue producing centers along with her coast line, her main ports and a large portion of her territory in the hands of the invader. To believe that China, unaided, can expel the Japanese troops from the country and win the war obviously is fantastic and preposterous. The conflagration in Europe, present-day world conditions and other potent causes definitely prohibit the appearance of any external assistance that actually could be helpful to China. The single outside force that might be exerted against China's adversary in the conflict would surely bring about, if that force were exerted, the complete loss to China of everything for which she has been fighting through the past two years. Such a loss would surely be far more devastating than any that might be imposed in consequence of Japanese victory. If conditions as they actually exist are to be assessed, past wrongs, real and fancied, and all the moral aspects, artificial and actual, must be laid aside and ignored. There is no morality, only destruction, in high explosives. These are the crass realities of the present-day situation in East Asia.

A Hybrid Growth in China

It cannot be denied that Communism, which was transplanted directly from Russia, and which first took root in China eighteen years ago, from the beginning to the present day, has been fostered and supported actively by the Comintern, that is to say, by the Moscow Government. China experimented with this alien political growth through about seven years, then, in 1927, the Chinese leaders of that day, awakening suddenly to a realization that their own positions were imperilled, sought by drastic action to uproot and remove the alien influence. It was in that era that Chiang Kai-shek, after he had achieved eminence with the aid of Russian arms and Russian advisers, founded the Chinese National Government, which through its several withdrawals to recent times, first to Hankow, and then to the present Capital at Chungking in Szechuan, has retained the recognition of Occidental powers as the Government of China.

This is the simple historical record of recent times in outline. Through this period and through earlier times Russia has been the traditional invader, the traditional enemy and the major menace of the nations of East Asia. Many decades before Japan had won a place of importance in world affairs and at the time when China was being torn asunder by the great Taiping rebellion, Russia was fastening a grip upon Chinese territory in the Russian thrust eastward toward a warm water Pacific port. China first lost to Russia her great northern maritime provinces, a large portion of the Soviet Siberia of to-day. Later, near the turn of the century, China virtually gave to Russia the rich provinces of Manchuria, enabling the Muscovite to push on to the seaboard, overshadowing Korea and menacing directly all Japan. Unaware that China was the ally of Russia, Japan had to fight for her existence. The Russo-Japanese war followed and the Russian thrust eastward was parried. After the World war and the rise of the Bolshevik Communist regime at Moscow, when that government was striving to consolidate its position and was dreaming of a world-wide revolution, the Moscow leaders, repulsed in Europe, turned their eyes eastward and took up again the course in that part of the world that the Czars had been unable to follow through.

Russia then was not strong enough to challenge Japan. Her leaders turned toward China, then torn asunder by internal conflicts. Here was fertile soil in which to plant the seeds of the doctrine that the Russians hoped to impose upon the rest of the world. Dr. Sun Yat-sen, the great Chinese patriot, who then was living in Shanghai, believed he could obtain no help from the Occidental powers to bring to realization his dream of a "Republic of China." He opened the way to the Russians and gladly they entered. Chiang Kai-shek, then but an unknown subordinate commander with Sun Yat-sen's forces at Canton, only emerged as a leader after the death of Dr. Sun Yat-sen in 1925. He was wholly familiar with the drift of events, in which he was playing a part of increasing importance, and was aware of the swift growth of Russian influence, which was directed to a considerable degree to the purpose of capturing and converting to Communist ideals the mind of young China.

General Galens and Borodin

Chiang Kai-shek astutely turned to his own uses all the Russian aid then available in his counsels. The Russian General Galens was his principal military advisor, and associated with General Galens was the figure of Borodin, who soon became a dominant force in political affairs. In time Chiang Kai-shek became aware that his own prestige and the prestige of his associates in the group of Chinese leaders surrounding him was being eclipsed by the influence of the Russians. General Galens, who had fought under the last Czar as an officer in the World War, was rated as one of the ablest military strategists in Russia and his talents became evident when he was sent to China. The successes of the Cantonese army that Chiang Kai-shek led on the long march from Canton to the Yangtze assuredly were due in some measure to the counse's of General Galens. When that army at length reached Wuchang on the Yangtze its Chinese commanders came to the unhappy realization that their great achievement had in fact been simply a victory for the Moscow Comintern and that their positions were overshadowed by the influence of the Russian leaders with whose assistance the victory had been won.

It was at that juncture that with ruthless decisive action Chiang Kai-shek displayed the genius for leadership, which later at Nanking enabled him to organize the existing Chinese Government, and which has characterized his whole career. Drastic orders to curb the Russian control were issued. To escape arrest Borodin and General Galens fled across the Yangtze to Hankow and thence northward back into Siberia. Within a few years General Galens again flashed upon the scene, this time under the name of General Bluecher, which is believed to be his real name. He became Commander-in-Chief of the Far Eastern Army of the Russian Soviets in Siberia. His talents were displayed to the full through the early years of this decade in building up this huge Russian war machine in Siberia and, in co-operation with Moscow's plan of industrial expansion, in making the Siberian army he commanded autonomous and completely independent of the Soviet armies in European Russia. Thus the whole northern boundary of Manchoukuo was fortified and the Siberian army was mechanized to a high degree of perfection while constantly it grew larger. Immense military establishments were created along this line equipped with tanks and other mechanized units and extensive hangars, made safe from aerial attack, were built of concrete underground to house an ever expanding fleet of pursuit planes and bombers. At the same time an undisclosed number of submarines, said now to number more than a hundred, were shipped over the Siberian railway to Vladivostok where they were assembled and placed in readiness for instant action against Japanese shipping. This brought the Russian menace to within seven hundred miles of Japan's main ports and centers of industrial activity.

China's War Against Communism

While these developments were taking place in Siberia Chiang Kai-shek at the head of his newly formed Government at Nanking

fought through eight years in one campaign after another striving to destroy the Chinese Communist armies that the Russian influence had created, mainly in south central China. He succeeded at length in dislodging the main Chinese Communist forces from their principal stronghold in Kwangsi when the Chinese Communist armies succeeded in eluding the surrounding Government troops and in a historic thousand-mile march into China's hinterland reached Szechuen where they have since been entrenched.

The great turning point in the affairs of China came in December of 1936. Earlier through that year the Tokyo Government, as it had done through the years that immediately preceded the "Manchurian incident," had been exerting every effort to adjust relations between Japan and China. Missions of various kinds had been travelling between the two countries with the avowed aim of bringing about closer and more cordial relations between the two countries. Japanese statesmen through this short period declared repeatedly that the aim of their Government was to seek amity with the Chinese and to co-operate by extending technical and financial aid in developing the resources of China for the mutual benefit of both nations.

Assuredly it was self-interest and sound diplomacy that actuated Japan through all these efforts in 1936 to strive to win Chinese friendship. Two factors defeated these aims and led at length to the present hostilities. The Russian communist influence, which had been so sedulously instilled into the minds of Chinese youth through the years of Russian participation in the direction of the embryo Chinese Government, and which was fostered zealously in most Chinese schools and universities, even through the period when Chiang Kai-shek was fighting the Chinese Communist armies, was at work twenty-four hours a day in a thousand forms in China and abroad to combat and defeat every Japanese effort to conciliate China. This was a deadly game of diplomacy, thrust and counter-thrust, between Tokyo and Moscow, with China as a pawn and with Moscow playing the trump cards she held through her thousands of well-schooled Chinese disciples within the country, and, through these disciples, with a measure of foreign missionary aid. With increasing anxiety Japan through this time was watching the swift growth of the Russian Far Eastern Army on the Manchoukuo border, an army first of a hundred thousand men, then three hundred thousand, and soon afterward a half million, possessing mechanized support of a strength probably greater than any other army ever has had. This army at length attained a strength in men and supplies that made it independent of support from European Russia. As a second major factor for the defeat of Japanese attempt at amity with China at this time stood the "Manchurian incident," which the Chinese adversaries of Japan presented, and which much of the outside world accepted, as an unanswerable argument. This record has to do only with events of current times and with the present-day war in China, so the need does not arise here to touch upon the "Manchurian incident" concerning which the Lytton League Commission wrote some five hundred thousand words and other publicists wrote five hundred million words, more or less.

The Episode at Sianfu

The climax of events of 1936 came in late December of that year at Sianfu, Capital of Shensi Province. In the years that immediately followed the "Manchurian incident" the Nanking Government, preoccupied with its warfare against the Chinese Communist armies, found it had on its hands the erstwhile ruler of Manchuria, Chang Hsueh-liang, known as the "Young Marshal," who with all his Fengtien following and their armed forces had been expelled by the Japanese from the northern territories they had so long misruled. The Young Marshal, who had inherited none of the rugged traits of his father, the Old Marshal, Chang Tso-lin, was a more or less amiable person, but he possessed no specially useful talents. By hereditary right he did have a nominal control at least of a horde of thousands of former Manchurian troops whose unaccustomed presence in a southern environment itself constituted a problem for Nanking. Also, what may or may not have been a factor in this situation, Chang Hsueh-liang possessed a huge personal fortune, said to exceed a hundred million, which he was reported to have been astute enough to remove far from Manchuria into the safer precincts of New York and London banking houses. He had been the "Co-Ruler of China" with Chiang Kai-shek for a brief space and he had to be taken care of. Chang

Hsueh-liang and his troops, then incorporated into the armies of the Nanking Government were sent into Shensi to fight against the Chinese Communist armies there. The Young Marshal was made Pacification Commissioner of the province with headquarters at Sianfu. It is known that these former Manchurian forces made contact in Shensi with the Chinese Communist forces, but it is not recorded that any serious military engagements took place. Chang Hsueh-liang and all of his troops were embittered against Japan owing to their eviction from Manchuria, and this may have furnished the reason why instead of fighting against the Chinese Communist forces they made friends with them.

Late in December of that year Chiang Kai-shek was lured to Sianfu, then promptly was made prisoner by Chang Hsueh-liang and his followers. How the things that then took place were brought about, or what conditions were imposed at that time, perhaps may never be known outside of inner Chinese circles. All the world, however, quickly learned what had happened. The warfare of the Nanking Government against the Chinese Communist armies that had continued ruthlessly through eight years, ended abruptly, and shortly thereafter an alliance was formed between the Nanking National Government's armed forces with the Chinese Communist forces. This alliance had as its announced aim open war with Japan. It may not be far from the truth to conclude that the decision for war with Japan was reached at Sianfu before Chiang Kai-shek was released and permitted to return to Nanking.

The Beginning of the War

After the Sianfu episode the situation in China daily grew more tense and hostility toward Japan more and more was emphasized. Assassinations and incidents of varying degrees of gravity followed one after the other in widely separated parts of the country. The actual war, which is still in progress, began in Shanghai on Friday, August 13, 1937, but a month before this major outbreak at Shanghai, on July 7, had occurred the Lukaochiao incident near Peiping when an exchange of firing between Japanese and Chinese troops occurred at the ancient Marco Polo bridge not far from Peiping. This affair in its opening stages was little more serious than other armed clashes that had preceded it and it might easily have been adjusted as a local incident if cooler counsels had prevailed and particularly if Nanking had refrained from sending large bodies of troops into the area of the controversy. Events as they unfolded through those months in 1937 seem to indicate that Chiang Kai-shek, willingly or otherwise, had fully committed himself at Sianfu to the Chinese-Communist alliance and to the repeatedly declared aim of the Communist leaders for open warfare against Japan. In view of Japan's lively concern over the growing strength of the Soviet Far Eastern army on the Manchoukuo border and the efforts inspired by fear of that Russian menace to make friends with China it does not appear wholly logical in these circumstances that Japan deliberately then was seeking to make war on China. It is true that Japanese influence at that time had been thrust into North China after the province of Jehol had been absorbed into the new State of Manchoukuo. This, Nipponeese leaders assert, was done primarily with the purpose of erecting additional safeguards against any Russian thrusts from Siberia, or from Outer Mongolia, which was and remains under Soviet Russian dominance. A secondary reason for Japanese action in the North was the quest for raw materials, so much needed for Japan's heavy industries, which she sought to obtain from China by exploiting Chinese natural resources in co-operation with the Chinese. To further these aims she gave support to disgruntled and quasi-independent groups in North China, which undoubtedly were encouraged and supported by Japanese military leaders on the ground. Added inspiration for these developments may have been a desire of Japanese militarists to retaliate for the bitter and increasing hostility toward Japan then being displayed in Central and South China by the Nanking Government. Evidence is not lacking that at this time Chiang Kai-shek had fully committed himself and his Government to the Chinese Communist purposes and had decided definitely to go to war with Japan. This evidence, strange to say, comes out of Philadelphia, Pennsylvania, U.S.A.

"China's No. 1 White Boy"

It will be conceded by anyone at all familiar with Chinese affairs that, second only to Madame Chiang Kai-shek in the

Commander's confidence, the one individual best informed about plans and intentions of the Chinese Government, a man who possesses a better understanding of Chinese affairs than any of the high officials in Chiang Kai-shek's whole entourage, is an Australian, the Commander's personal Counsellor. This is Mr. W. H. Donald. Mr. H. B. Elliston, a well-known writer, is a colleague and an intimate friend of Mr. Donald, and early last year Mr. Elliston wrote a magazine article on the really remarkable career in China of W. H. Donald. This article under the title, "China's No. 1 White Boy," was published in the *Saturday Evening Post* of March 19, 1938. In this article Mr. Elliston deals with the beginning of warfare between China and Japan, quoting letters he had received from his friend, Mr. Donald. One of these letters written by Mr. Donald from "Generalissimo's Headquarters of the National Forces" gives some enlightening authentic information about the beginning of the war. The letter, the writer says, bears the date July 30, which was exactly two weeks before the actual outbreak of the war in Shanghai. The text of this letter from Mr. Donald, as taken from the article in the *Saturday Evening Post* is as follows:

" . . . And now at this moment of writing, we are trying to shake up a real war with Japan. You will know all about it long before you get this, but China is going to fight. The German advisers say that China can hold out against Japan, and if the officers and men do what they are told, she can, in course of time, defeat Japan. They remember what trench warfare was in the Great War, and how the people in Madrid have held out during the past year. So, despite the fact that China has very inadequate air resources, and that the Japanese are superior in artillery, they feel that China has nothing to be afraid of now. Before you get this, the central government forces will be in action against the Japanese, and you will know how they stand the first test. Somebody ought to draw a cartoon of a monkey with his hand in a jar of nuts. That is the position Japan is in. If she lets go the nuts, she can get out of this situation, but if not, she is going to have a bad time of it, for her internal situation is not going to be improved by the adventure the army gentlemen have started upon . . . "

At the time this letter was written by Mr. Donald Chiang Kai-shek, beyond any possible turning back, had espoused the Communist cause in China. The Chinese Communist armies, nominally at least, had been incorporated in the armed forces of the Nanking Government and Chinese and Russian military and political leaders held influential places in the highest councils of the Chinese Government. They retain these places and their influence has waxed, not waned.

Japan's encroachments in North China clearly were attributable principally to menacing Russian activities and may have been a valid reason for the war with China that has proved to be so costly to both Japan and China. All the circumstances of that time, however, seem to indicate that Japan wanted no war with China. Tokyo vainly sought to negotiate over differences between the two countries, but all such efforts were frustrated at those conferences with Communist army leaders at Sianfu when Chiang Kai-shek was a captive. There is some evidence that Moscow's representatives in China, unintentionally perhaps, betrayed Chiang Kai-shek in conferences held with the Chinese leaders before warfare actually started. Soon after the fighting began M. Bogomoloff, the Russian Ambassador was recalled to Moscow, and to oblivion. The word that came out of Moscow at that time was that Bogomoloff had been removed because he "promised too much" to the Chinese.

Russia "Sitting Pretty"

Whatever truth may be in this report the Chinese found very soon after warfare actually had begun that Moscow had no intention whatever of becoming actively involved in the fighting in China. A viewpoint that is grimly apparent was voiced lately by the eminent Shanghai financier, Sir Victor Sassoon when he declared that in the world situation of the present day "Russia is sitting pretty." To the west the great European powers are fighting a war for her and in the Far East China is destroying herself and a traditional enemy of Russia for the greater glory of Russian Communism and World Revolution.

The major cause for the beginning of warfare in China successfully has operated through two tragic years to prevent restoration of peace, and the cause that started the war still functions and successfully frustrates every effort to end the hostilities. The

Chinese themselves cannot hope, without external help, to defeat Japan and expel the invaders from Chinese soil. The beginning of warfare on a large scale in Europe has made it doubly certain that China can hope for no external assistance. Nevertheless, China is urged to continue a futile destructive resistance and, doing this, she clings to a belief that ultimately she can emerge victor when Japan becomes completely exhausted and collapses internally. Daily the Japanese become more solidly established in the vast regions they occupy in China. The Chinese belief that the internal collapse of Japan will bring salvation for them appears to be wholly misguided, for should such an utterly unlikely thing be brought about, what reason can be advanced to believe that the well-equipped Japanese armies in China would leave the country? At worst, their resources would equal or be better than those the Chinese armies possess, and they hold the entire sea coast and all the main ports.

China Forbidden To Make Peace

On two separate occasions the Tokyo Government has offered proposals that held the possibility of bringing an end to the conflict. The terms offered on both occasions, in the opinion of competent neutral authorities, were not harsh or unreasonable. On the occasion when the first terms were presented, before the fall of Nanking, an official record discloses that most of the Chinese military leaders were disposed to accept the proposals as a basis to proclaim a truce and open peace negotiations. These proposals were conveyed to the Chinese Government by the German Ambassador, Dr. Trautmann. When these terms that the German Ambassador brought from Tokyo were explained and discussed at a meeting of the Standing Committee of the Supreme National Defense Council at Hankow, General Pai Chung-hsi said, "If these are the terms and nothing else, why should there be war?"

The reason this opportunity to end the sufferings of a sorely harassed population was lost can only be traced to adverse influences within the high councils of the Chinese Government. These influences again were actively exerted on the second occasion when the Tokyo Government pointed a way toward peace, when Prince Knoe, the Japanese Premier, on December 22 of last year, proposed a group of peace terms claiming no indemnity, no territory, guaranteeing maintenance of the unimpaired sovereignty of the Chinese Government and implying willingness to withdraw Japanese forces from China. The only possible inference that can be drawn from these circumstances is that the Chiang Kai-shek regime at Chungking is dominated and held firmly in the grip of interests utterly unconcerned about the sufferings of China's vast inarticulate population. These interests, if their will prevails, will permit no conclusion of peace, on any terms whatever, and effectively will forbid any moves that might lead to the opening of negotiations through which a peace might be concluded. Their evident single intention is to compel continuance of resistance and unabated hostilities until all China is bled white to utter prostration and Japan is brought to the point of exhaustion. If this charge is not valid, if it is not fact that the Chungking regime finds itself obliged to continue a hopeless struggle, why has not that regime announced peace terms of its own, however extravagant, or displayed any faint show of willingness to negotiate to end hostilities?

It was this state of affairs that caused Wang Ching-wei, who was second in authority after Chiang Kai-shek in the Chinese Government, to leave Chungking. It was significant and quite logical that when Wang Ching-wei, freed from the restraints of Chungking, exerted efforts to bring about peace negotiations that Chungking should attack him savagely, expel him from the Government with a flourish of trumpets, blacken his character in the eyes of the people and brand him traitor. Traitor, forsooth, he may be—traitor to the Comintern. This is a distinction which, if his efforts achieve success may in time win for him the gratitude of an emancipated people.

All the circumstances indicate that the recognized Chinese Government already has gone the way of the Government of Outer Mongolia, and the way of the governments of the westernmost provinces. Only through success of efforts Wang Ching-wei is sponsoring can China hope to retain administrative integrity. If these peace efforts fail, then the war between China and Japan can end only when negotiations for this successfully are concluded by Japan at Moscow.

China's Financial Plight

(On the subject of the well-nigh tragic financial situation in China, involving Chinese and foreigners alike, an authoritative analysis has been made by two distinguished Shanghai financiers the Messrs. Sopher brothers, whose long experience qualifies them to speak with certain knowledge of what may be in store for Shanghai and, in fact, for the whole of China. Their article, which was published recently in the *Shanghai Times*, cannot be said to present a hopeful outlook for the future; the article, however, does possess the high virtue of being wholly lucid. It will require no special financial genius or competency for the ordinary individual to understand the simple explanation of these writers in dealing with basic fundamental facts when they point out sapiently that "the issuance of currency is a sovereign right of the State, and its strength and stability can be no greater than the strength and stability of the Administration of that State, which in turn is derived from the character and condition of the people at large, or the populace." The article follows :)

By ARTHUR AND THEODORE SOPHER

QNAPPEASED with three drastic declensions, Chinese-managed currency has caught myriads in yet another and more terrible debacle. The fall from the low of 6½d. to 4d. equivalent to a rise in the value of £ from \$37 to \$60, in terms of our depreciated currency, is so shocking and so unbelievable to the man-in-the-street that he will not accept the reality nor be reconciled to it. He has been let-down on the unthinkable! What hope is there for the victim to be extricated from the toils of this ruthless mangle?

For the vast majority of the injured, no blame whatever is attachable, as it is not to be expected that they should have been aware of conditions, which, on the surface, were so deceptive. How could one, confronted with an array of lordly choral approbation for Chinese management of their currency under the leadership and counsel of the foremost economic adviser to the British Government, Sir Frederick Leith-Ross—how could one dare to breathe nonconformity? And what is more, the Gibraltar-like Equalization Fund was there to tender you—day-in-and-day-out, months on end, till the very monotony itself deceived you—with all the foreign currency that you wanted. To such an extent was this carried out, that veteran, thick-hided, rhinoceros-like sceptics changed-over at the alluring rate of 8½d. to the dollar, converting all their pounds sterling into Chinese dollars, and confidence mounting upon confidence, went one better, committed themselves for long-term borrowings in foreign currency attracted by reduced rates of interest. These latter to-day are unnerved and unhinged; their capital strength has been halved and their debts doubled. Such was the power of the deception to work its havoc! It was inconceivable to these otherwise able and successful men—masters of speculative vision—that they could come to this pass of perilous enmeshment.

A Retrospect

To dwell on one very tricky phase of the whole sorry business, let us put ourselves back to but a few weeks ago. When the third decline had occurred on the 7th and 8th of June—the breakaway from 8½ to 6½d.—a new surprise was devised during the Dragon Boat festival of the same month, and sprung the first business day thereafter, June 22. This consisted of a second partial moratorium on Chinese bank accounts. The unhappy depositor was debarred, for the second time, from withdrawing more than \$500 a week. It was aimed to prevent flight from Chinese currency into equities or foreign moneys.

Obvious was it, therefore, that this artificial shortage of local currency would enhance our dollar in terms of foreign denominations. Instantly, exchange made a recovery, and the boom on the Shanghai Stock Exchange was knocked on the head.

Additionally, news was forthcoming that a sizeable loan from the U.S. Government was being contemplated.

Four reassuring factors against a further decline were standing out in the mind of the businessman, trader or investor:—

- (1) The recent sudden drop from 8½ to 6½d.;
- (2) The new partial moratorium;
- (3) The fact that last time the Equalization Fund had held the rate at 8½ for 11 months;
- (4) The American news about fresh loans to China.

The result was that there was every reason for the importer to withhold settling his exchange, for the exporter to dispose of his bills, and for the investor to remain tranquil with Chinese money. No-one, except those who were on the inside and friends of the Government officials—and of course those who had a long fixed policy not to regard Chinese currency as a store of value—could have profited and/or protected themselves from the last and most precipitous decline of all, viz., that from 6½ to the neighborhood of 4d., which was just around the corner.

Turning A Quick Fortune

After the crash occurred, one heard of some people who had the uncanny prevision of turning a quick fortune—of entering into contracts of exchange on a shoe-string just at the brink. And, at every single one of the four crises from 1935, rumor loomed large as the sky itself that closely placed Chinese officials bought pounds sterling in the million. These scandals, it seems, can never be run to earth, here in Shanghai or China.

So much for this last debacle. And when we have got over from being aghast and staggered, quietened down to a calm understanding of the position, much usefulness may still be derived in observing necessary precautions and apprising ourselves of what is ahead. The businessman, who picks up his daily newspaper to seek for an explanation after the event, is supplied with reasons for the result which sound so plausible and seem so convincing. It is true that the immediate causes ascribed are more or less accurate but they leave no taste of satisfaction, nor offer any guidance as to the future. All that we see is a post-mortem examination, and the hind-sight that is so riling. However, a comprehension of fundamental factors is the basis of foresight which appears like prophetic vision.

Being Wise After the Event

When one reads and listens to the catalogue of reasons and arguments after the event, one appears so foolish not to have acted sensibly. For instance, in this present annihilation we are told, on the one hand that:—

- (1) \$50 million Northern China bank-notes were acquired by Japanese, brought to Shanghai and used for buying foreign exchange;
- (2) Japanese were buying up export produce with military notes and selling the same for foreign currency, thus depriving the Chinese Government of the benefit of same;
- (3) Closing of all Chinese coastal ports disrupted the exit of goods;
- (4) Japanese used up all Customs funds for their own benefit;
- (5) Flight of capital;
- (6) Great excess of imports over exports.
- (7) Speculative operations.

On the other hand, one is schooled in that:—

- (1) Exchange dropped because the Control Fund stopped selling;
- (2) The latter has been completely exhausted;

- (3) Before replenishing it, if they ever do so at all, the sponsors want to see a natural level which can easily be defended ;
- (4) The British Government, now that they have entered upon the Tokyo talks over the Tientsin Blockade, will not aggravate matters by supporting Chinese currency ;
- (5) In fact, the Japanese Military at Tientsin threaten to tighten the Blockade, if they see new currency aid coming ;
- (6) That the last help of £10 million melted into thin air in a short period of three months ;
- (7) Helping Chinese currency is like throwing good money into a bottomless pit.

Going Down to Fundamentals

These are the arguments of the one side and the other, but none of them touch the basic fundamental facts, from which the safest guidance may be had.

In the first place, going down to root causes, the issuance of currency is a sovereign right of the State, and its strength and stability can be no greater than the strength and stability of the administration of that State, which, in turn, is derived from the character and condition of the people at large, or the populace. A particular soil and climate can yield only certain growths. An acorn can only flourish into an oak in a given environment ; likewise, bamboos grow in their appropriate surroundings. Managed currency was never suited to China. In fact, its installation was one of the greatest aggravations that brought on the Sino-Japanese hostilities.

China was the first State in the world to have paper money, and the first State to abuse it. Several times in Chinese history war resulted from the ensuing chaos. Things had reached such straits that edict upon edict was issued abjuring paper money, so much so that for four centuries—almost half a millennium—before 1850 it was interdicted in China. Paper or fiat money is tantamount to managed currency.

Archæologists tell us that all the currency frauds of ancient Greek history were connected with the rule of tyrants and that the honest handling of money was associated with the Democratic States. Lord Baldwin had at one time gone so far as to say that he would not trust any government in the world with managed currency, and that only gold was knave-proof.

Managed Currency Pitfalls

Managed currency is bad enough in times of peace, but it becomes hopeless in a condition of war. Let us assume that the Chinese currency reserves are intact, of which we have absolutely no real knowledge. Granted this, they cannot meet their \$2 billion note issue, dollar for dollar, for the same good reason that the American Government though it had 100 per cent, gold cover, decided not to do so in 1933. Why ? Because the outstanding money obligations of the American State were not the small note issue, which they could easily meet, but the huge superstructure of bank credit, which was as 25 to 1, that the Government could not

meet because of the colossal decline in values from 1929 to 1932. These obligations could not be met in full, and President Roosevelt in Congress in 1933 pointed out that if there were to be a liquidation, each U.S. \$1 would probably get 4 cents in gold.

Thus in a modern State, there is not only treasury issue of notes, but bank credit money which is many times the note issue. Even in times of peace, when there should happen to be a depression and consequent decline in values, obligations cannot be met in full and there must be devaluation. Such, for instance, as we saw in September, 1931, when Great Britain was forced off the gold standard, and when all other States followed one by one. Huge destruction in values had occurred for one reason or another, and the Governments of all nations had to go back on their solemn promises to pay out gold on demand to the tenor of their bank-notes. That was a wholesale breach of faith in times of peace.

Piling Up of Debts

Not only this, with the rearmament programs running full-speed, more mountainous debts are being piled up, which are non-producing in an economic way, and some more devaluations for the best currencies in the world are surely in the offing. Experts are agreed that a disparity of 10 to 20 per cent between one currency and another—say between the pound sterling and the U.S. dollar—could easily happen.

Thus, we in China have neither a British nor an American democratic government—our first major and fundamental disability. Next, we are not in a condition of peace but in a state of war, the worst since the Great War of 1914-1918. Tremendous losses have occurred in destruction, expropriation, loss of revenue, decline in values, all of which stood behind the total credit obligations of the whole Chinese nation. Therefore, even if the currency reserves are intact, yet the total obligations cannot be met dollar for dollar.

The only question is how immense is the total loss, and whether present rates of exchange, such as 4 to 4½d, are a true measure of China's money.

Even assuming that we have touched bottom for the present, and that war should cease to-morrow, yet the losses will continue and thus the general total security behind the general total obligations must continue to attenuate.

All this is on the assumption that the currency reserves are intact. Should they perchance not be so, then the situation will be still worse. Furthermore, it is not likely that Great Britain will worsen her relations with Japan by further support for Chinese currency.

Therefore, we have arrived at the most critical pass for Chinese managed currency, when it must stand on its feet or fall, and if there is more unsoundness about it than we know, it is not likely that even present lowest rates can be maintained.

Whilst one could not hazard an opinion as to Chinese exchange rates for the near future, which may show considerable artificial recoveries, the long-range view is still in the same downward direction, as before.

Laveran, Pioneer in Malaria Research Work

IT was in November 6, 1880, that Charles Louis Alphonse Laveran discovered the malaria parasite in the blood of a patient in Algiers. This discovery of the cause of the terrible malady, which still attacks 600 million persons every year, was received very sceptically by colonial doctors. But Laveran had not been deceived, and his research work had marked the commencement of a new era in the fight against malaria. Twenty-seven years later he received the Nobel Prize for Medicine.

When Laveran found himself for the first time face to face with the malaria parasite, he was still only thirty-five years of age. The great scientist lived until he was seventy-six. In 1884 he was appointed professor at the Val de Grace College in Paris, where he was born.

It was not the Nobel Prize that crowned the career of this disinterested French scientist, but the great satisfaction of knowing that in his capacity of pioneer in research work connected with malaria, he had pointed out a new way for carrying on the fight against that malady. In fact, his discovery made

it possible to decide whether a fever patient was suffering from malaria or not.

His scientific work opened up new horizons to malaria specialists. When the parasite found by Laveran was also discovered in the malaria mosquito, the problem regarding this infection was solved. The marvellous natural product, quinine, could be administered to malaria patients in a more efficacious manner. On the other hand, during the past few years, the Malaria Commission of the League of Nations has whole-heartedly supported the efforts of those who fight against malaria, thanks to the following prescription : as a preventive measure, take six grains of quinine per day during the fever season, and for treating an attack, a daily dose of 15 grains to 20 grains of quinine during five to seven days.

On page 125 of its report, issued in 1938, this Malaria Commission stresses the fact that among the anti-malarial drugs, quinine still ranks first in current practice, by reason of its clinical effectiveness and almost complete absence of toxicity, coupled with the widespread knowledge of its use and dosage.

How Duties Would Affect Philippine Exports

By WALTER ROBB in the Manila Chamber of Commerce Journal

NONE of us can see beyond 1946. We are only men. We are not clairvoyant. As the cards now run, the Philippines will be separated from the United States in 1946, but the deck is not played out. However, if that takes place the existing basis of duty-free trade between the Philippines and the United States will be modified. It may be changed but little, or it may be changed altogether. It will be changed in some way, if our proofs of its validity independently of political relations are not accepted.

The least change suggested comes from President Roosevelt, who in 1946 will no longer be in office. This is an ascending application of duties during 20 years commencing in 1941 and reaching full duties in 1960, or 14 years after independence.

We can examine our main crops under the prospect of existing American tariff duties.

Our five main crops are rice, sugar, hemp, coconuts and tobacco.

Six million Filipinos grow rice, on some two million hectares of land. The hulled output is about one million metric tons a year, consumed as bread at home; that is to say, in the Islands.

Of the other four crops, 78.2 per cent of the total combined annual production is sold overseas. Only 21.8 per cent is used in the Islands; and not even that much, because this 21.8 per cent still includes fiber made into cordage that goes overseas for markets; and coconuts converted into desiccated and other edible coconut meat that also goes overseas for markets, almost exclusively in the United States; and leaf tobacco that, manufactured into cigars and cigarettes in Manila, is finally exported, again chiefly to the United States.

However, we will use, to-day, the percentage cited.

The 78.2 per cent is the average tonnage of all four crops exported. It does not hold for each crop, among which there is great variation of volume and value. But the 78.2 does mean that when we grow 100 measures of these four crops, we must sell more than 72 measures in other markets than our own. It shows our dependence on markets abroad, the American market first of all. But the 78.2 is made up in this way: 92 for sugar, 90.5 for hemp, 60.5 for copra, 47.3 for tobacco. Tonnage grown of these four crops averaged 1,910,793 for ten years ending 1937. Tonnage exported averaged 1,491,734 in the same period, 78.2 per cent of the total production, plus additions already mentioned.

Average sugar production during ten years was 896,862 metric tons. Average exports of sugar were 829,790 metric tons, 92 per cent.

The Commonwealth estimates that two million Filipinos live from sugar. In value, sugar is now running about 40 per cent of all our exports. The land involved is 300,000 hectares, about seven per cent of the 4½ million hectares under cultivation.

Last year's sugar exports brought the Islands a little more than P.100,000,000 or \$50,000,000 gold (Total exports, gold not counted, P.231,590,554, or \$115,795,277). The only market for this sugar is the United States, where the Philippines quota is just over one million short tons.

In the Islands we go by piculs.

When these notes were written, the New York sugar price was P.7.84 per picul. The U.S. duty for this 96 degree centrifugal sugar is \$1.875 per 100 lbs. That is P.5.25 per picul. There is left over, from a market price of P.7.84 per picul, a balance of P.2.69 per picul. This to cover all charges of production, marketing, and delivery, and to divide between planter and mill, and meet taxes.

Men in the sugar industry say it will not suffice. Philippine sugar, they claim, cannot survive the U.S. tariff. It is obvious that this is true. The tariff is prohibitive, and so intended to be. It is made primarily in benefit of Cuba, who herself is charged 90 cents per 100 lb. as a protection to America's domestic sugars, beet and cane. For example:

The Federal commerce department shows that in 1937 the United States bought 6.392 billion lb. of foreign cane sugar. Cuba's

share of this, at a duty of 90 cents per 100 lb., was 65 per cent of the total. The Philippines share, duty free, was 30 per cent of the total (The Cuban rate, had Philippine sugar paid it, would have summed a little more than P.36,000,000 or \$18,000,000). The remaining five per cent, of no importance to any of them, certainly it would not be important to the Philippines, was shared among some 20 countries.

This five per cent included some special sugars, polariscope 100, on which the duty was as high as \$2.52 per 100 lb. A European country sent some invoiced at \$15,000 on which the duty exceeded \$33,000. All this sugar is in the U.S. quota. Quantities are stabilized.

The American sugar tariff sometimes changes. If we think of Philippine sugar getting to the American market after independence at the Cuban rate, 90 cents per 100 lb., that too would be a charge of P.2.63 per picul. At the market on the day these notes were made, that would leave P.5.21 for a picul of Philippine sugar landed in New York. It is contended that our sugar cannot move at that price. This is probably true. Yet there is no reason to hope that after 1946 when the Islands are independent, they can get their sugar to New York at better than the Cuban rate.

If Congress is granting the Philippines away for any reason on earth, it is to be rid of what is called competition. The riddance, unless we can stop or moderate it, is desired to be lock, stock, and barrel. The Philippines do not have Cuba's geographical claims, nor her claims under the Monroe doctrine. No one can gamble on the Cuban rate for their sugar.

Unless they continue their association with the United States, they will lose an economic argument and win a political point. This point will hardly bring home the bacon.

Copra is in another category. It is on a duty-free basis throughout the world. Coconut groves mantle 610,000 hectares of cultivated lands in the Philippines, 13.4 per cent. The Commonwealth says four million persons maintain themselves from this crop.

During ten years ending with 1937, annual copra production was 795,016 metric tons. Annual exports were 481,300 metric tons, 60.5 per cent. But though copra is duty-free both in Europe and America, coconut oil, derived from copra, is a different story (Oil is converted to copra equivalents in the statement of exports just given).

Copra exports in 1938, excluding oil, were 348,113 metric tons valued at P.24,512,028. The U.S. took 226,528 metric tons, some 64 per cent of the total. Since Europe had equal opportunity to buy, that means that as a rule America offered the better prices.

But all coconut products exported, copra included, brought P.59,172,739. *More than half was not copra, on a value basis* (This P.60,000,000 nearly, by the way, was 3/5 of what sugar brought the Islands, and more than 1/4 of total exports, *by value*).

Philippine exports of coconut oil in 1938 were 164,278 metric tons valued at P.21,419,526. Of this, 160,776 metric tons, or 97.8 per cent, went to the U.S. Our oil mills obviously produce for the American market. They employ 2,600 workmen, and without the American market their operations would close.

They will lose the American market when independence comes and the oil tariff applies. That tariff is two cents gold a lb. Here is the situation: Copra is duty-free, oil pays two cents gold a lb. This duty is a two-cent differential per lb., against Philippine mills in favor of American mills. The Philippine oil of course cannot compete.

Edible coconut remains, chiefly desiccated. Exports last year summed nearly P.8,000,000. The quantity, nearly every kilo to the U.S., was 24,277.44 metric tons. This reduces roughly to 54,381,466 lb. The duty is 3½ cents gold per lb., or seven centavos. Last year that would have been a total of \$1,903,351, or P.3,806,702. After 1946 when the duty applies, unless our mills can then compete with Ceylon's they will be out of the U.S. market and yet another shutdown will leave 4,000 men out of work.

Hemp is next.

Once queen of all Philippine exports, hemp has lost ground in every way except in volume. Sugar and copra have gained. Hemp production *per capita* has been cut in two during the past 35 years. So, at current prices, has its value. Last year's exports brought only P.20,318,347 for 141,315 metric tons. The Commonwealth says that two million persons maintain themselves from hemp. The figure may be too low. As some means of a livelihood, hemp is important in half the provinces of the country.

However, last year was abnormal. Japan figures in more than 50 per cent of the market when times are normal. She buys extensively, and Japanese merchants deal as buyers and exporters. Hemp was therefore affected last year by the China situation. Japan curtailed her buying. In 1937, a better year to go by, hemp exports were 165,339.3 metric tons, invoiced at P.43,279,373. This was about 1/7 of total 1937 exports, *by value*.

Hemp, we may say, will keep on, though on no expanding market. It sells duty-free everywhere.

During the ten years ended with 1937, average annual hemp production was 179,213 metric tons. Average annual exports were 161,864 metric tons, 90.5 per cent. The Philippines, no negligible market for cordage, have four cordage mills of mercantile importance. These use a small portion of the total hemp crop.

Philippine cordage has a quota duty-free in the American market of six million lb. a year, exclusive of binder twine, that is not accepted from the Islands. Independence should end this quota, and bring on the duty of two cents gold a lb., while opening the field for binder twine, duty-free. Some European countries, Belgium among them, market cordage in America and pay this duty, and also some duty-free twine. The Philippines should be able to do likewise.

But there is this certainty. America, an increasing volume of foreign cordage and twine reaching her market, will protect her homeside mills and raise the cordage duty, perhaps adding duty on twine. She is not giving the Philippines independence in order to take more of their products, but to take less of them. Such a policy is essentially false, economically, but it is America's determination—just now.

In summary as to hemp: Under all circumstances conceivable, our hemp will continue to sell throughout the world, more competition rising all the time—no hope of higher *per capita* output. Exclusion from the U.S. market, or limitation in that field, will not necessarily close our cordage mills; they will feel, however, increasing competition from Japan, if not from Japanese China. Hemp is still queen, but in straitened circumstances. She can hold no gaudy court, and she will find it hard to subsist her humble subjects, two million Filipinos, if not four million.

Now for tobacco. The Philippine tobacco crop comes from 55,430 hectares. Average production during ten years ended with 1937 was 39,702 metric tons a year. Average exports of leaf were 18,780 metric tons a year, 47.3 per cent. The Commonwealth says that 500,000 persons maintain themselves from this crop. But tobacco factories in Manila and its environs are the most important of all, employing thousands of persons where other factories employ hundreds.

It seems not far out of the way to say that half the crop sells abroad, half goes to the local manufacture of cigars, cigarettes, etc.; and of the total cigar output, half, or about 200,000,000 in sum, go to the U.S., at a value of about P.6,000,000 on the invoices.

The leaf sold overseas goes chiefly to Europe for the state monopolies, of course at low prices. Little sells in America, where none at all can sell after 1946, against the tariff.

The American tariff on foreign cigars (also the Philippine) is \$4.50 per lb., plus 25 per cent *ad valorem*, to which is added internal revenue of \$4 per 1,000. On Philippine coronas that go to American jobbers at \$80 per 1,000 and sell two-for-a-quarter at the retailers, duty and revenue charges would be \$114 per 1,000. This is 11.4 cents gold per cigar, sold for 12½ cents gold retail, but only eight cents gold wholesale. Paying duty, Manila can't sell one corona in America.

In fact, a small percentage of the U.S. tariff applied as now arranged on an ascending scale of five per cent a year after 1940, will knock Philippine cigars out of the United States altogether.

The bulk of these cigars is a cheap cigar retailing at two for five cents gold. These cigars invoice to importers at \$14.50 per 1,000. Jobbers pay \$17 per 1,000. The basic duty would be \$90 per 1,000. The *ad valorem* would add \$2.90, and internal revenue \$4 more, a

total of \$96.90 per 1,000 that is more than seven times the wholesale price of the cigars. The business is borderline business. Not only can the U.S. duties *not be paid*, but five per cent of them cannot be paid and keep the business alive. Working people affected number 10,000 all working in Manila or its immediate environs.

The Tydings-McDuffie act therefore knocks out Philippine cigars in the American market at once, when five per cent of the American duties apply in 1941. For five per cent of \$92.90 is \$4.65 that brings the factory return down to \$9.85 per 1,000 and makes manufacture impossible at subsistence wages to cigar makers.

Instead of the ascending duties, however, cigars and certain other minor Philippine manufactures are offered descending quotas in the American market, under the pending Philippine bill in Congress. This bill solves nothing, it does provide a breathing spell and further time in which to reach final conclusions.

A suggestion has been made that Congress might finally accept. Because there is always to consider, the American goods the Philippines buy, approximating \$100,000,000 worth a year. After 1946, unless final solutions are reached in the 1944 conferences, these American goods will be affected by any tariffs the Philippines then care to impose; and the bulk of the trade will no doubt be destroyed. The Philippines will be affected by many strong new influences, already evident here, and in any case they will hardly buy where they will be practically unable to sell.

The new proposal is, however, a fair exchange of duty-free products between the Philippines and the United States. Excluding all duty-free products (copra, as we see, and hemp), to allow in America from the Philippines, year by year, products equal in value to the American goods bought by the Philippines.

This barter would require expert administration, which would have to be paid for somehow. But there is much to recommend it over anything else we have heard of; except of course the actual free trade and extension of existing relations, clearly the best solution all round, if statesmen come to accept it.

The barter has the great advantage of taking into account the Philippines' growing population, and possible further diversification of crops. Each country simply says, to the other, "We'll take as much from you as you can take from us—over that you pay us duty." That is practical.

The one remaining point is diversification. We have two duty-free crops now, but there are others that we might grow. Rubber is one, tea another, and coffee, African palm, and even other fibers than hemp. But you find most of these crops even now far overproduced and overplanted, in the countries now famous for their production; and probably all these countries envy the Philippines their coconuts and hemp. To try to say how far diversification in order to reach the America market is practical in the Philippines, is a speculation beyond the bounds of this brief paper. We can try, of course, but we may take it as granted that the effort will not be all beer and skittles.

Wireless Stations in China

Japan's Cabinet's China Affairs Board has decided to build wireless stations at various places in China for the purpose of maintaining close communications between Japan and that part of China under Japanese military control, according to the *Nikkan Kogyo*.

The board reportedly has estimated that an appropriation of Y4,500,000 will be required for the cost of construction. Negotiations have been started with the Finance Ministry to secure that amount from second reserve funds, according to the journal.

Immediately following the establishment of the China Affairs Board, a plan to establish wireless stations in China was drafted by the board, which asked the Finance Ministry to provide money from the 1939-40 budget's supplementary fund. The proposal, however, was shelved.

As a result of a compromise between the Ministry and the board, they decided to consider the matter later. The board, however, now considers it urgent to establish the stations and therefore has reopened negotiations.

According to the plan, wireless stations will be built in Peking, Kalgan, Tsingtao, Shanghai and Amoy, where the board has liaison departments, and several other places in China, where there are agencies of these departments.

Wang Ching-wei Answers Some Questions

(Following is the text of an address that was given by Mr. Wang Ching-wei before a group of journalists on the occasion of a reception he gave on the afternoon of September 7)

WAST year, in December, I left Chungking, having failed in my repeated attempts to persuade the Central Kuomintang and the National Government at Chungking to seize the opportunity to negotiate an honorable peace. They knew clearly that peace was at hand, but being dominated and, in fact, controlled by the communists they refused to avail themselves of the means to put an end to the war of resistance, in accordance with the principles laid down by the Manifesto of the Emergency National Congress of the Kuomintang of April, 1938. So I had no alternative but to leave Chungking, in response to the real will of the people and at the request of many comrades, in order that I could freely express my views and be heard by the masses of the people. For a time I stayed in Hanoi, and then, after a visit to Tokyo, I went to various cities under occupation, such as Peiping, Nanking and Canton. The purpose of my visiting Tokyo was to find out whether the Declaration of Prince Konoye of December 22 and my Peace Proposals of December 29, could be made a reality. I further wanted to bring about the moral unity between the masses and comrades at Chungking and those in the occupied areas. To achieve our task we must carry out two steps; the first is Party Renaissance, that is, to restore the original character of the Kuomintang and its liberty of action, independent of outside influences. The second is to save China from destruction by putting an end to a futile and meaningless war and inaugurating an era of peace. The Sixth National Congress of the Kuomintang has just been held and its Manifesto and the various resolutions were passed by unanimous vote. Having accomplished the first step of my task I thus take this opportunity to meet you.

I had lately received a number of enquiries from some of you. Some of these enquiries can be answered collectively, others individually, while to some no answer can yet be given.

Someone asked how I, expelled by Chungking, can have still the authority to conduct activities in the name of the Party. This is indeed a very frank question, which I welcome and will answer in the same spirit.

The first point to remember is that the highest organ in the Kuomintang is its National Congress. Whosoever contravene the resolutions passed and adopted by that body, are committing illegal acts. Now my peace Proposals were actually based on the Manifesto issued by the Emergency National Congress. It is the Chungking Central Kuomintang and the Chungking Government which, in contravening that Manifesto, have committed illegal acts. It is they who are the guilty party, certainly not me.

Secondly, the Kuomintang is a revolutionary party. In the execution of its function in ordinary times, ordinary methods of procedure must be employed. But in times of emergency, a special procedure is called for, in accordance with the revolutionary spirit of a revolutionary Party. There are many such instances in the history of the Party.

For instance, in 1927, when the Central Kuomintang and the National Government were still in Wuhan, General Chiang Kai-shek, who was then in Nanking, seceded from the National Government on the ground that that Government was completely dominated and controlled by the Communists. He therefore organized a new Government, and commenced a general Party purge. The Central Kuomintang in Wuhan decreed the expulsion of General Chiang Kai-shek and the National Government issued a warrant for his apprehension and arrest. But subsequently, the Central Kuomintang and the National Government found out that the Communists were carrying on subversive activities. They too started a general purge against the Communist elements, and decided to co-operate with the Nanking people.

The following year, in 1928, I strongly opposed the personal dictatorship of General Chiang Kai-shek at Nanking, which had led to internal strife and rudely shaken the foundations of the nation. The Central Kuomintang and the National Government in Nanking, thereupon, decreed my expulsion from the Party and issued an

order for my arrest. In 1930 and 1931, I successively organized the Enlarged Party Convention in Peiping and the Extraordinary Party Convention in Canton, to oppose General Chiang's Dictatorship. Then the "Manchurian Incident" took place on September 18, 1931. General Chiang sent representatives to Canton to negotiate with us for co-operation, and a conference was subsequently called in Shanghai to settle our differences in the interests of national unity. I then assumed office as President of the Executive Yuan of the National Government in Nanking. Such are the instances in the past. The present developments in the Party are clearly indicated in the Manifesto issued and the measures adopted by the Sixth National Congress which are available to the general public.

Now let me tell you something of my visit to Tokyo. Shortly after the Emergency National Congress of the Kuomintang in April last year, General Chiang relieved Mr. Kao Chung-wu of his post as the director of the Asiatic Department in the Ministry of Foreign Affairs and entrusted him with the important mission to go to Hongkong to arrange peace negotiations with Japan. The allegation that Mr. Kao Chung-wu acted on his own and was without authority is therefore absolutely untrue. During the negotiations there had been many opportunities for both parties to come closely together, but they always stumbled on the question of the personal position of General Chiang, which caused him frequently to change his mind on the question of peace. My visit to Tokyo was not along a new line of approach; it was only to prevent the negotiations started by Mr. Kao Chung-wu from breaking down. And the results of my negotiations with the Japanese authorities during my visit to Tokyo gave a concrete basis to my belief that Prince Konoye's Declaration and my Peace Proposals can be made a reality.

With regard to my various visits to the occupied areas, I regret to say that wherever I went, rumors immediately circulated to the effect that I was establishing a Government in that locality. And on my departure, the rumors had it that I had failed in my efforts. All this, of course, is part of the Chungking campaign of malicious misrepresentation of my activities. The fact was that I was merely carrying out my task of discussing with my comrades and those non-party patriots who have the same views, how best to save the situation and carry out our responsibilities. In addition, I met, and discussed with, the competent Japanese military authorities with a view to secure the proper realization of certain concrete measures to save the situation.

Our first step, Party Renaissance, has been accomplished. Our second step, the realization of the concrete plans for saving the situation, is now undertaken. But it has at the present moment not yet reached the stage of organization, the national Government, and I am therefore not yet in a position to answer any queries concerning the Chinese Customs revenues, the currency and other fiscal matters which are questions to be dealt with only after the organization of the Government.

With regard to the withdrawal of the Japanese troops from China, it must be borne in mind that evacuation is always the result of peace. And while the Chungking Government is still shouting Resistance, it is obvious that no general evacuation can be effected, which can only take place after peace is re-established and the nation unified as a result of the downfall of the present Chungking regime.

The question has been raised, whether the Chinese forces are adequate for taking over the evacuated areas. The answer to this question is, first, that any Chinese army which publicly adheres to the peace and anti-Communist policy as laid down by the Manifesto of the Sixth National Congress will be left intact and will therefore be in a position to reoccupy the areas evacuated. Secondly, as a result of the depredations of the guerillas, the populace in the respective war areas have now organized militia units for their self-protection. They have veiled their support for the peace and

(Continued on page 390)

China's Industries in Wartime

Various activities of immense scope that are proceeding in China's far western provinces are described in detail in this article by a Chinese writer and traveller, who recently made a tour through the western provinces that are remote from scenes of hostilities. In his survey the writer describes progress made in developing China's heavy industries, in increasing mining production, particularly gold, in developing agricultural resources, and in expanding communications.

* * *

FORTY-FIVE units of 12 different heavy industries are in full operation in Free China despite the war, according to Mr. Chien Chang-chao, Deputy Director of the National Resources Commission, which was entrusted by the Government in 1936 with the execution of China's Three Year plan for the development of heavy industries.

Without disclosing their locations and capacities, Mr. Chieh, a British returned student, mentioned the following 45 units (the term unit being used to avoid revealing any clue to the capacity of each plant) four metallurgical units, four electrical appliances units, four chemical industry units; five gold mining units, two copper mining units, two iron mining units, three tin mining units, one mercury mining unit, eight coal mining units, two oil extraction units, eight electric power plants, two water power plants.

Had it not been for the Japanese invasion, there was every reason to believe that the program would have achieved an unqualified success by this summer, and that China would have been that much further ahead on her road to industrialization.

Launched in July, 1936, exactly one year before the Japanese armies started their war of aggression in China, the program aimed to accomplish with foreign financial and technical assistance the following ten major projects by the summer of 1939:

- (1) The institution of control over China's tungsten and antimony output and export, to be accompanied at the same time by the erection of a ferro-tungsten plant capable of producing 2,000 tons of ferro-tungsten every year;
- (2) The erection of steelworks (at Hsiangtan in Hunan and Man-an-shan in Anhwei) capable of producing 300,000 tons of high-grade steel annually, which, it was estimated, would be sufficient to meet half of the nation's needs every year.
- (3) The production of 300,000 tons of iron'ores (at Linhsiang and Chalin in Hunan) every year;
- (4) The development of copper mines (at Yanghsin and Tayeh in Hupeh and Penghsien in Szechuen), to be accompanied simultaneously by the opening of a copper smelting plant to produce annually 3,600 tons of copper, which represents half of the nation's needs.
- (5) The development of the lead and zinc mines (at Suikow-shan in Hunan and Kweihsien in Kwangsi), the object being to produce annually 5,000 tons,—enough to meet the nation's needs;
- (6) The exploitation of the coal deposits (at Yuhsien in Honan and at Kaokong and Tienho) with a view to producing annually 1,500,000 tons of coal in order to prevent any shortage in Central and southern parts of the country;
- (7) The erection of a coal-liquefaction plant, to be accompanied at the same time by the extraction of petroleum (from pools at Yenchang in Shensi, and Pahsien and Tahsien in Szechuen) with a view to producing 25,000,000 gallons a year, which constitute about half of China's annual needs;
- (8) The establishment of a plant to manufacture 50,000 tons of ammonium sulphate every year, as well as sulphuric acid and nitric acid for arsenals;
- (9) The erection of machine-works, including those manufacturing airplanes, motors, generators and working tools;
- (10) The erection of plants to manufacture enough electrical wires and tubes, telephone sets and other electrical appliances for domestic purposes.

This program was to have cost \$230,000,000, Chinese currency. To begin with, the Chinese Government gave \$10,000,000 to the National Resources Commission when the plan was first set in operation in 1936. In several instalments, this fund was raised to \$36,600,000 by March, 1939, which included \$8,400,000 of profits

resulting from the government control over the sales of tungsten and antimony on foreign markets.

The lion's share of the necessary capital, the Chinese Government expected to obtain from foreign sources, and according to Mr. Chien, substantial amounts of foreign capital had actually been secured in the first year to finance a large portion of the program.

Everything went according to schedule in the first year, the only exceptions being the delay in the erection of the steelworks at Hsiangtan, the cessation of preparations for the airplane motor factory and the postponement in setting up the coal-liquefaction plant. The nitrogen factory and the exploitation of the lead and zinc deposits in Kweihsien.

Foreign Technicians Help

As to technical assistance, the National Resources Commission had succeeded in 1936 in arranging for German experts to aid in the construction of the ferro-tungsten factory, the coal-liquefaction plant and the nitrogen factory, German and British experts for the steelworks, American and Swiss experts for the machine works, and German, British and American experts for the factory to manufacture electrical appliances.

At the expense of the National Resources Commission, more than 20 Chinese technicians were sent on investigation tours to foreign countries or to various parts of China. To train more technical personnel, the Commission employed between 80 and 90 college graduates to work at its headquarters or in its various industrial plants. After a period of service, the promising ones were to be given more responsible positions or financed to seek advanced studies in foreign countries. In addition the Commission consented to subsidize 12 Chinese institutes of technology in their purchase of more equipment and the increase of their teaching staffs.

The Japanese armies began their large-scale invasion of China in July-August, 1937, just at a time when the program was entering its second year. The outbreak of hostilities over an extensive area has greatly affected the plan. Mining establishments near the war zones had either to remove or to suspend work. The ferro-tungsten plant was to have been ready for operations on August 1, 1938, but it had to be dismantled and shipped elsewhere because of threatening developments at the Kiangsi front in June.

The steelworks at Hsiangtan, planned by German experts had already been completed and the ground work at the premises, and a wharf were likewise ready. Following the outbreak of the war, however, work had to be discontinued in view of the geographic proximity of the new plant to scenes of fighting. Expensive installations in the machine-works and the electrical appliances factory had also to be carried hundreds of miles inland. The coal mines at Kaokong and Tienho had already commenced to produce coal but had to be abandoned. The projects for developing the copper mines at Yanghsin and Tayeh and the lead and zinc ores in Suikowshan were also pigeonholed because of the war.

The National Resources Commission, which has Dr. Wong Wen-hao, China's leading geologist and Minister of Economic Affairs, as its director, carried on its activities undiscouraged. Its work in fact increased as it was called upon to do a great deal of emergency work, such as the control of fuel, the purchase of raw materials needed in time of war, the giving of help to private industrial establishments in their removal from the war zones to the hinterland.

Upon the dissolution of the Reconstruction Commission in the Spring of 1938, its numerous power plants were turned over to the National Resources Commission, which thus added the production of electric power to its industrial and mining enterprises. In areas remote from the battlefields, new units were set up, and machines, evacuated to the interior were re-assembled and made productive again.

China Increases Gold Production

During the 12 months from June, 1938 to May, 1939, four Chinese Government banks, acting as agents of the national treasury, bought up 143,000 ounces of pure gold from private producers in various parts of Free China. Averaging \$200 an ounce, the purchases involved a transaction of over \$28,600,000 Chinese currency.

This much gold, earmarked exclusively to bolster the specie reserve behind the Chinese dollar, by no means represents China's total output of that precious metal during the period. Experts estimate that somewhere between 37,000 and 47,000 ounces still remain in private hands.

The production of from 180,000 to 190,000 ounces of gold in 12 months marks a significant increase in China's output. For many years, the annual production averaged 130,000 ounces only. The upward trend is traceable to the "Get More Gold" Movement in wartime China.

Mr. Hu Po-yuan, a noted Chinese mining engineer opined that, given the necessary amount of machinery, China's annual gold production can be easily raised to 1,100,000 ounces within two or three years. The author, who was trained in the Massachusetts Institute of Technology and later in the University of Pittsburgh, gives the following estimates of annual gold production in each province, if machinery were used: Hunan, 360,000 ounces; Szechuan, 260,000 ounces; Kwangsi, 100,000 ounces; Kweichow, 70,000 ounces; Chinghai, 100,000 ounces; Sikang 200,000 ounces; Shensi, 100,000 ounces; and Honan, 50,000 ounces.

Mr. Hu recommends that foreign co-operation in the form of machinery and technical personnel should be encouraged in the exploitation of China's gold mines. With the exception of parts of Honan and the northern tip of Hunan that have fallen into Japanese hands, all these gold-producing districts are intact in Free China.

Gold for China's War Chest

"Gold is where you find it." And thousands of people are finding gold in China's western provinces to help swell the nation's war chest.

With technical help from the National Resources Commission of the Ministry of Economic Affairs and with the help of various provincial authorities, six gold-mining administrations have been organized in the provinces of Sikang, Chinghai, Hunan, Szechuan, Honan and Kwangsi. Directing these concerns is the Bureau of Gold Mining under the Ministry.

Most of Chinese gold comes from private mining organizations. In 1938, 56 new permits were granted to such enterprises, making a total of 101 gold-mining companies. There are also a number of individuals and groups which have not troubled to ask for permits. About 150,000 ounces of gold was mined by licensed miners last year.

Szechuan, the richest province of the nation's Golden West, is one of the nation's leading gold-producing provinces. More than 200,000 of its people are mining and panning gold, especially along the upper reaches of the Min and the Kialin rivers. With pick and pan, each gold-washer in northern Szechuan averages two dollars worth of gold a day; while those who work in mines, average one-tenth of an ounce from each pit.

Aiding these gold-miners in their enterprises is the Chinese Industrial Co-operatives which has helped organize 12 gold co-operatives in southern Shensi, and plans to extend its service to miners in Szechuan, Hunan, and other provinces. It hopes that the total output of gold in western China will be increased to 300,000 ounces or \$3,000,000 worth before the end of the present year.

Besides increasing the production of gold mines, the Chinese Government is buying gold from the people to strengthen the Government reserves. Private transactions are prohibited. All purchases must be duly registered with the Government and all sales must be made to the Government banks at official rates, the last figure being \$210 per ounce. A joint office for buying gold was organized by the "Big Four" of China's banking, the Central Bank of China, the Bank of Communications, and the Farmers' Bank of China.

People selling gold nuggets, bars, ornaments to the Government banks are entitled to a "transaction fee" of three per cent of any amount under ten ounces, four per cent for 10 to 50 ounces, and five per cent for more than 50 ounces. Goldsmiths buying gold for the Government banks get a commission of six per cent. As a result of this encouragement, the Chungking Branch of the Central Bank bought more than 13,000 ounces of gold in January, 1939, as compared with its former average of 500 ounces per month. It is estimated by that bank that the "Big Four" will buy 200,000 ounces of gold in the first six months of 1939, while various private banks should take in 100,000 more. Another 600,000 ounces may be expected in other provinces within the same period making a total of 900,000 ounces.

Mercury Assumes New Significance

Mercury, the bubbling, running metal that for centuries intrigued the medieval alchemists is to-day intriguing the strategists of the western world, for the problem of its supply has within the past few months become one of the major concerns of the men who control the armed forces of the democracies. In their search of new sources of this vital metal, the deposits of South-west China have assumed a new significance.

Derived after long processing from the crushed ore of red cinnabar, mercury is compounded into such key chemicals as fulminate of mercury to become one of the essential constituents of high explosives. In the balance of world economy, the western world has been accustomed to get its chief supplies of mercury from the fabulously rich deposits of Spain. The dependence of the West on these supplies is, however, in the light of the rapidly changing political situation, apt to prove a snare. Spain, by the victory of General Franco has aligned itself with the fascist powers and its mercury resources are no longer at the certain command of democratic commerce in the event of war. It thus became necessary for the democracies to seek new supplies in friendly countries.

Stimulated by the demand of the West for more and more mercury from new sources, China has turned to the exploitation of her rich mercury deposits in the South-west. The agency of this development is the Kweichow Mining Administration, capitalized at \$600,000, and jointly controlled by the National Resources Commission and the provincial government of Kweichow. Plans of this Administration call for the raising of the present rate of mercury production in Kweichow from a few tons a month to a level of 500 tons annually.

Prior to the War, China produced annually from 300 to 500 tons of mercury, almost all of which was exported. The mercury was mined in Hunan and Kweichow provinces. Owing to recent unsettled conditions in Hunan, production there has considerably fallen off, and the government's new efforts are directed at the intensification of production at the Sengchihhsien mines in Kweichow.

The projected mercury exports from Kweichow will prove of greatest importance in China's struggle to secure as much foreign exchange as possible. The world market price of mercury has for the past few months been firm in the neighborhood of £500 a ton. The Mining Administration has accumulated 150 tons of mercury from private holdings for delivery abroad in the near future. It is expected that as soon as the administration has fully introduced modern technique and methods in the mines, a steady supply of the valuable metal will be available in sufficient quantity for the markets of the world.

China's Tungsten Supply

China retained her position as one of the world's principal suppliers of tungsten in 1938 by exporting 133,577 quintals—100 kilogrammes to a quintal—at a total value of \$50,492,082, according to the Foreign Trade Commission of the Ministry of Finance.

Although the quantity exported represented a decrease of 31,601 quintals as compared with the 165,178 quintals of 1937, the cash return was actually \$9,743,490 more than the \$40,758,592 of the previous year. Experts believe that China will be able to maintain her output record during the current year, because the production centers of tungsten in southern Kiangsi, northern Kwangtung and southern Hunan are all under Chinese control, remote from theater of hostilities.

Besides its wide use for industrial purposes, tungsten is indispensable to alloy steel used for armor plate, airplane parts, guns and in other armaments. For the three years ending in 1937, Germany, on account of her rearmament program, was the largest purchaser of Chinese tungsten ores. She took 23,332 quintals in 1935, 14,664 quintals in 1936 and a record high of 48,153 quintals in 1937. The last figure formed 29.1 per cent of China's total export of the metal in that year.

The United States took 10,720 quintals in 1935, 13,992 quintals in 1936 and 23,804 quintals in 1937. In the same three years, Great Britain bought 8,781, 7,937 and 16,338 quintals respectively. France took 5,528, 2,496 and 20,098 quintals.

A remarkable change, however, was witnessed last year. The quantity exported to Germany dropped from the 48,153 quintals of 1937 to 7,250 quintals in 1938. The United States and Great Britain each took 750 quintals, while France took 1,000 quintals.

Yunnan Builds for the Future

Already launched and well under way is the Five Year Reconstruction Plan for Yunnan Province which aims to raise the annual value of production to a level of \$100,000,000 according to Mr. Chang Si-ling, reconstruction commissioner of the province.

The leading reconstruction project at present is the stimulation of silk cultivation in Yunnan. It is hoped that in five years Yunnan's silk production will be raised to an annual output valued at \$10,000,000. Scientific methods of sericulture will be introduced to lift the annual production, by the time of the completion of the plan, to 10,000 piculs annually. At present the province exports only small quantities of silk to the United States, but it is expected that the outgoing volume will reach a total of 5,000 quintals within two years.

Tea ranks next in importance on the list of Yunnan's reconstruction projects. Hundreds of tea cultivators have come here from the coast and have established new tea colonies on scientific principles. Favoured both by climate and by skilful care it is hoped that Yunnanese tea will match in popularity abroad of the Keemun brand which is the boast of coastal China.

Although each year the production of foodstuffs in Yunnan reaches impressive levels (rice: 20,000,000 quintals a year, produced on 1,700,000 acres in the south-west; wheat: 600,000 quintals, produced on 900,000 acres in the north-east). The present yield per acre in the province is rather low. The production goal for rice is set at the coastal standard of 200 catties from each acre of rice field. Attention is also being given to the production and improvement of wheat,—for Yunnan, due in part to the lack of mills, imports no less than 10,000,000 catties of flour annually (One catty is approximately 1½ pounds).

Much importance is attached to the manufacture of high-grade flour from wheat produced in the province. The suppression of poppy cultivation will enable the farmers to utilize 1,700,000 acres of fertile land for rice and wheat production.

In previous years, the Yunnanese annually spent more than \$20,000,000 on cotton and cotton goods. The Yunnan authorities are studying the possibilities of providing improved raw cotton sufficient to supply a mill of 20,000 spindles as a first step towards self-sufficiency. The Bank of China is ready to invest \$3,000,000 for promoting cotton plantations in Yunnan.

Meanwhile the cultivation of *gossypium barbadense*, a special kind of cotton produced in Yunnan that has the longest and thinnest fibre in the world will be extended to the southern part of the province. The present annual output of cotton in Yunnan is estimated to total 3,500,000 catties, which amount will be increased to 12,000,000 catties a year within five years by proper cultivation methods. Considerable attention is also being given to the promotion of the ramie industry.

In the development of the province's rich mineral resources, the provincial and National Governments are co-operating. Already in operation under joint control are a \$3,000,000 copper smelting company, a \$20,000,000 iron and steel works, and others. In addition, the Provincial Finance Bureau has a large industrial stake of its own: a \$6,000,000 tin-smelting company, a \$1,500,000 hydraulic power plant, a \$3,000,000 salt manufacturing plant, and the \$4,000,000 Yunnan Mining Administration.

War has also affected the industrial map of Yunnan. The Ministries of War and of Economic Affairs each own a number of independent plants in Yunnan producing materials necessary for national defence.

The Ministry of Communications is working furiously to complete the Yunnan-Burma and the Yunnan-Szechuen railways, which will give the Yangtze valley a rail link with the Indian Ocean.

In the realization of these many projects, the Government would welcome foreign and overseas Chinese capital. Recently several investigating commissions sent by enterprising overseas Chinese have come to the province to probe its potentialities.

First Gasoline Plant

The faces of Chinese chemists and engineers who have been toiling incessantly for the past few months in an improvised building somewhere near Chungking, China's wartime capital, above the Yangtze Gorges, are now radiant. For they are fast approaching their red-letter day, the day when they will complete setting up the first gasoline plant in China.

The importance of this factory, first one of the series planned, can be readily appreciated when it is remembered that China has practically no oil industry to speak of, and that since the blockade of her coast by Japanese warships, she has been experiencing more and more difficulties every day in securing the necessary imports from abroad in order to keep her industrial machines going.

"In just a few more weeks, we will be able to produce," these experts cheerfully confide to those worthy of their confidence. How much per day? To begin with, one thousand gallons a day. That will make 30,000 gallons a month or 360,000 gallons a year. They admit that the quantity is barely sufficient for consumption in Chungking alone, but they have a plan to double the output a few months after their first gallon hits the market.

China's yield of petroleum is commercially negligible, but in Szechuen, economic storehouse for her prolonged resistance against Japan there is plenty of vegetable oils to be had. Principally they are tung (wood) oil, and oil extracted from peanuts and vegetable seeds. These are the staple raw materials to be used in China's premier gasoline plant. In Chungking imported gasoline is sold at \$4.50 Chinese currency, per gallon. The native product may be able to undersell the foreign brand by a slight fraction.

The most remarkable fact about this new factory, more will be established as soon as the necessary equipment and supplies are received, is that all its machines were designed by Chinese engineers and built in Chinese steelworks. The steel plates and parts bought in Hankow last year at a cost of \$180,000, Chinese currency, are to-day worth at least five times as much.

In various parts of China's south-west, a number of refineries have been turning out large quantities of alcohol for industrial purposes. Either used with ether or with gasoline mixture, alcohol has been generally used for non-military transportation. Somewhere in Szechuen, a huge alcohol distilling plant, using sugar molasses is producing alcohol 96 per cent pure. With further research it is expected to raise its degree of purity to 98 per cent. Similarly research has been completed for turning vegetable oil into crude oil for Diesel engines.

Thus, the forthcoming operation of the gasoline plant and of its satellites later-on will bring China another step nearer the solution of her war time liquid fuel problem.

Yunnan-Burma Railway

By personal order of Generalissimo Chiang Kai-shek, the 280-mile western section of the Yunnan-Burma railway from Ziang-yung to the borderline will be built on a 0.60-meter-gauge instead of a one-meter-gauge as originally planned. This is only one of the measures taken to rush to completion the 530-mile Yunnan-Burma railway which is scheduled for operation by the end of 1940.

Work on the Yunnan-Burma railway was begun on December 25, 1938. It is now progressing rapidly from both ends. The authorities believe that by narrowing the gauge on the western section of the railway from one meter to six-tenths of a meter the problem of the supply of labor and materials during construction will be greatly simplified. The project will require the labor of 100,000 workers and an expenditure of \$100,000,000, in addition to the cost of material and equipment purchased abroad.

At present the construction of the railway is under the direction of Mr. Tu Cheng-yuan, who has behind him a brilliant record as the director of the Chekiang-Kiangsi and Hunan-Kwangsi railways. It was he who brought the 215-mile Hengyang-Kweilin section of the Hunan-Kwangsi Railway to completion in less than ten months. The appointment of Mr. Tu further indicates the desire of the government for quickest possible completion.

In building the Yunnan railway, particularly in western Yunnan the Chinese engineers have encountered many difficulties. First, Yunnan laborers are mostly unskilled. Secondly, lack of medical and sanitary provisions in the interior of the province, especially in the few hundred miles nearing the Burma border where malignant malaria takes heavy toll of human life. Thirdly, the complicated topography of western Yunnan which is a continuation of the Himalaya and Nanling mountain ranges makes work extremely difficult. Fourthly, the rainy season causes disruption of work for at least a few months in the year. Fifthly, materials and equipment from foreign countries are still difficult to bring in.

Despite these difficulties and hardships, the work goes on. Unskilled workers are drafted from neighboring counties, while skilled ones are brought in from outside. Thanks to the rich

resources of the province, part of the raw materials for construction can be found almost anywhere on the route.

The new railway will cross the Mekong and Salween Rivers which will in turn carry away part of its transit cargo for distribution in Sikang and Chinghai provinces in the north and to the vast, virgin stretches of west Yunnan in the south. The railway trip from the Yunnan-Burma border to Kunming will take at most four days whereas before the war, regular overland transport required a total of 38 days of travel along the old route. The railway will traverse more than 100 tunnels and a number of bridges.

The completion of the new railway will relegate the service of the newly-constructed Yunnan-Burma highway to secondary importance. Although built in narrow one-meter and 0.60-meter gauge, the new railway will still have a minimum freight capacity of 300 tons a day or approximately 10,000 tons a month. Fuelled with the coal that can be readily supplied by the rich provincial mines, it will save both time and expense in transportation.

Experts estimate that the more than \$100,000,000 construction cost of the new railway will be easily earned back in a little over a year. Furthermore, the addition of rail to highway transportation between Burma and interior China will release a large number of trucks, operating on the Yunnan-Burma highway, for military use behind the front lines.

New Planes for C.N.A.C. Fleet

Three new Douglas airliners—two luxurious D.C.-3's and one D.C.-2—have been ordered by the China National Aviation Corporation, a joint concern of the Chinese Government and the Pan American Airways, from the United States. The first of the three giant planes, the C.C.-2, will arrive in Chungking and join the Corporation's air fleet early in June, and the two D.C.-3's will be ready for service by July.

With these new arrivals, the Corporation will have six Douglas airliners in addition to the "Kweilin." This plane, after having been waylaid, shot down, and machine-gunned by five Japanese "fighters" near Canton on August 24, when 14 people including two women were killed, has been thoroughly repaired and will rejoin the service in the near future. The Corporation has, in

addition, a fleet of modern land and amphibian planes, composed of Stinsons, Beechcrafts, Dragons, Commodores, Dolphins, and Loenings, plying its various airways.

The Corporation will assign its veteran Chinese pilots to mind the new planes. The company now has five American pilots, all holding American commercial pilot licences to fly its giant Douglas ships. With the increase in planes, however, Chinese pilots will be called upon to reinforce their American colleagues. The Corporation has nine Chinese senior pilots. This, however, will not be the first time that the Corporation's Chinese pilots have flown these types. During such emergencies as the evacuation of Hankow last October, a special night service was maintained by Chinese pilots. It was Chinese airmen who made four night flights with Douglas ships from Hankow just before the Japanese vanguard entered the central Yangtze City. The ship that took off from Hankow was a flying boat piloted by a Chinese.

The Chinese pilots of the Corporation are men of wide experience. From Mr. F. J. Thom, chief pilot of the C.N.A.C., down, all are veteran airmen who have thousands of hours of flying experience to their credit. Some of them were trained at such well-known American flying institutions as the Curtiss-Wright Flying School, and some in the Hongkong Far Eastern Flying School. They have to go through a rigid examination in order to join the service or to be promoted to full pilot.

A corps of 79 foreign and Chinese mechanics are stationed at the Corporation's various aerodromes and work shops to see that the machines are always in perfect order. They are under the direction of Mr. O. C. Wilkie of Wisconsin, who is chief mechanic.

The Corporation maintains 24 meteorological stations along its air lines giving regular weather reports to flying headquarters. It has also 55 radio operators stationed along its air lines keeping direct contact with the Corporation's headquarters in Chungking. Seven operators are constantly assigned to the company's giant airliners.

To facilitate flying over southwestern China's misty and cloudy territory, the Corporation's giant airliners are all equipped with Telefunken Homing & D.F. devices and with a beacon system. Turn and bank indicators, climb indicators, artificial horizons and gyro compass are installed on all planes of the corporation to ensure safe flying.

Motorship "Korea" Launched in Denmark

ON Tuesday, July 18, 1939, the Nakskov Shipyard Ltd. of Nakskov, Denmark, launched the new No. 88, motorship *Korea* built for The East Asiatic Company, Copenhagen. The *Korea* is a cargo-motorship destined for the Company's routes to East Asia. It has been accommodated with saloons and cabins for 12 passengers like the other ships of this Company, serving the same routes. The ship has the following principal dimensions:

Length	..	506-ft. 6-in.
Breadth	..	65 „ 0 „
Depth to upper deck	41 „ 9 „	
Carrying capacity..	about 12,600	tons

The ship has been built to Lloyds highest class of the complete superstructure type with forecastle. She has seven watertight bulkheads all carried up to upper deck, and double bottom in whole length of ship.

The *Korea* will be fitted with six hatches, two masts and six Samsons-posts, 16 derricks and one 20-ton and one 40-ton heavy load derricks. The derricks are served by 16 electrical winches.



Launching of the "Korea" at the Nakskov Shipyard

Also the ship has been furnished with one electrical warping winch on deck aft, and electrical windlass, all delivered by Mr. Thomas B. Thrige, Odense, who also supplies the electrical steering gear.

Saloons and bed-rooms are arranged and furnished very comfortably, like the other ships which have been built for The East Asiatic Company by the Yard, f.i. has each cabin free-standing bedsteads and its own bath-room. The Dining saloon is placed on upper deck, Smoking saloon on Bridedeck. These rooms compare in every respect with the corresponding rooms in the big Liners.

Galley and bakery are furnished with oil-fired ranges, baking-oven, etc., and a very large refrigerating plant is installed for provisions.

The main-machinery consists of one B. & W. double-acting two-stroke Diesel-engine, developing about 10,400 i.h.p., which gives the ship a speed of 16 knots loaded.

On the vacant berth the keel is now laid for a 15,300 ton Diesel-tanker for a Danish Owner.

A Nisei Visits Hankow

By KAZUMARO UNO

Herewith is presented the observations and impressions of an American journalist of Japanese parentage gleaned in the course of a recent brief visit he made to China's greatest inland port on the Yangtze. Representing a number of newspapers in the United States, he is accredited to the Japanese Military Forces in China as a war correspondent. This is the second of his letters to appear in these pages, the first having been published in the preceding number.

HANKOW, CHINA August 20—(By mail)—Ordinarily, it requires seven days to reach Hankow from Shanghai via the Yangtze River. I arrived here yesterday from Shanghai in three hours and ten minutes on a navy bomber which had been converted into a 14-seater passenger plane. Hankow is now the center of the Japanese army's concentration. Chinese refugees, heat and cholera.

This is my second visit to Hankow, one time China's "Chicago." I was here last year on October 27, the day the Japanese army and navy simultaneously occupied the city. At that time, Hankow was a miserable city, the Japanese Concession in total ruins as the Chinese applied the "scorched earth policy" to the abandoned settlement, the French Concession was over-crowded with Chinese refugees of the upper class, and the special districts Nos. 1, 4 and 5 were horrible scenes exemplifying the aftermath of a defeated area and its innocent victims. Imagine abandoned streets strewn with corpse of refugees who had perished from hunger and sickness. Unlike Chinese cities, not a single ricksha was seen as I wandered around getting my first taste and lesson on price of defeat.

To-day, I roamed the same streets and byways of Hankow and I was awe-stricken to mark the changes that had taken place in this "forgotten city" since last October. Thousands of refugees filled the lively streets, rickshas caused automobile traffic to be dilatory, miniature shops lined the dusty, odorous streets for miles and prosperity seemed to be blessing the people of all ranks. Questions came to my mind: "Where did these people come from?" and "Where had they hidden the rickshas and merchandise during the hectic days of last October?" I was really puzzled. Giving up, I surrendered to fantasy: "Maybe they have an underground city where they can hide people, rickshas, and merchandise."

Hankow Foreign Population

The total population of Hankow, as far as reliable sources can record, is close to a million with the total foreign population only 1,240. In spite of the fact that the French are the only foreigners who maintain a Concession in Hankow, their population is small. According to registrations made with the Japanese authorities here, the following figures reveal the proportion of the foreigners in Hankow:

British (Indians included)	320	French	..	..	36
White Russians	.. 230	Swedes	..	..	20
Americans	.. 160	Dutch	..	..	18
Italians	.. 110	Portuguese	..	..	13
Germans	.. 97	Soviet Russians	..	..	5
Belgians	.. 70	And others	..	..	53

Further study into the above data discloses that the majority of the total are missionaries in the case of Americans, as nine out of every ten claim to be missionaries or doctors connected with mission hospitals. The majority of 230 White Russians are women and almost every Frenchman is connected with the diplomatic corps. The surprising fact is that only a small number of the foreigners live in the French Concession, others are living in areas under Japanese jurisdiction. There are four gun-boats in Hankow protecting the lives and interests of Third Powers: two British, one American, and one French.

Japanese in Hankow

Everywhere in Hankow are Japanese soldiers, lending an atmosphere characteristic of the "front." Having been in many other cities under Japanese occupation, I could not help but detect the heavy troop concentration centered in Hankow. Even the civilian Japanese population was in one way or another linked with the military as all businessmen are dealing with the army supplying

the troops with food, clothing and provisions. No less than fifteen hotels here occupied chiefly by army officers, officials of the Military Special Service Corps and businessmen who are using the hotels as temporary residence. The Japanese civilian population is not very much more than 2,000. As for the army . . . your guess good as mine.

Typical of a "frontier" town, Hankow is drawing a horde of small-time profiteers from Japan and Korea. During my brief stay, I was able to see the tactics of these get-rich-quick scavengers.

Not content in exploiting Chinese refugees, they imported adventurous young boys and girls from Japan and worked them to the bones. I'm staying in a Japanese hotel which charges me Y15 per night with breakfast included. My room is located on the sixth floor. The elevator is out of order, but no effort is made to repair it. It might cost too much money. Food cannot be described. And the unfortunate girls "enticed and financed" from Japan by the owner of the hotel work daily from 6.30 in the morning all through the day until after midnight; only one day off each month.

However, there are pioneer Japanese who came to Hankow thirty or forty years ago, established various businesses between Japan and China. Many of these old timers have returned and now are seriously concerned over the "invasion" of Hankow by selfish, money-mad profiteers, who cannot contribute toward Sino-Japanese amity through business enterprises. I spoke to a Mr. Okumura of the Eikwa Yoko Co., an import-export firm established some 26 years ago by Mr. Ichiro Doi of Osaka, Japan, and he said that a group of pre-hostilities businessmen is encouraging



The Port of Hankow, Inland Metropolis of Central China fell before the advancing Japanese troops on November 27, 1938. It was the last great city surrendered by the Kuomintang regime and normally has a population of a million inhabitants

newcomers to Hankow to adopt a "permanent stay" policy and contribute toward establishing a sound and permanent trade relationship between China and Japan. Expansion of Japanese business into Hankow was only made possible at the cost of thousands of Japanese lives dedicated to peace and goodwill. Get-rich-quick profiteers who come and go from China are not contributing any part in carrying on the work dedicated by men who gave their lives so willingly for this worthy cause. In initiating a movement to awaken the younger businessmen to appreciate the meaning of peaceful penetration into China, Mr. Okumura and others are organizing a social and recreational club. This is chiefly to draw the interest of young men away from money and money alone. What Japan needs in China to-day are more men of Mr. Okumura's calibre. His appreciation of China is paramount to his pecuniary motives in China.

And Life Goes on

With the population of Hankow divided between Chinese war refugees and Japanese soldiers, life is going on . . . with the standard of living already slightly advanced compared over the Hankow at the time of the Japanese occupation, according to information gathered from numerous sources.

Perhaps the Chinese enjoying the biggest boom in their business are the coolies and ricksha pullers. Coolies are earning from \$50 to \$100 per month compared to their former wage scale of \$35 to \$50 (Note Chinese dollars referred to here). Ricksha pullers were paid five coppers for three-quarter mile run. To-day, they demand and receive ten to twenty cents for the same distance (three coppers equal one cent). It is no wonder that thousands of one-time oppressed Chinese are heralding and supporting the new Japanese sponsored Central China Provincial Governments.

Steadily, wealthy Chinese are returning to Japanese occupied areas, although those who remained in the French Concession waiting the counter attack of Chiang Kai-shek's troops to regain Hankow are still cold toward Japanese . . . probably still waiting for Generalissimo's return.

In the meantime, foreign businessmen are drawing big salaries from their respective companies in spite the fact that business is partially paralyzed. Many of them still receive from \$200 to \$1,000 in U.S. gold per month. At the present rate of exchange, it means they have a monthly income of from \$3,200 to \$16,000 in Chinese money. I met "Sailor Pinky" off the U.S. Gun-boat *Guam* at the International Club, a night club in the Japanese occupied sector of Hankow. He is the king of the night clubs of Hankow. His monthly check from Uncle Sam is only \$60, but change that into Chinese money and he has \$960. The time I saw him, he was up to his ears in straight whisky, just lost twenty Chinese dollars in "small game" as he called it and was tipping the Chinese boy a dollar (Usual tip for



Rickshas—people—life—progress—in Hankow on August 20, 1939

the children's playground as nurse-maids." Reminds me of the club in the British Concession in Shanghai which is open to all nationalities except Chinese regardless of his wealth or rank. Can you blame the educated Chinese turning out to be rabid anti-British? Who is to be blamed? How long would others tolerate such conditions? But in China . . . life goes on . . . with indifference to conditions elsewhere.

Censored Interview

"Uno, if you are going to use anything that we might have discussed yesterday, don't mention my name or the company's. We have a very hard and fast rule relative to interviews—unless Shanghai's approval is secured—penalty, dismissal. Wishing you a good trip back . . . (signed) F., your friend."

This is the note I received at my hotel this morning. Only yesterday I had interviewed this friend who was introduced to me by a Consulate official. He is the branch manager of a large foreign firm and has travelled extensively in China, having spent sometime in Tsingtao, Shanghai, Wusih, Kiukiang, Hankow, Changsha and Ichang.

One of the most encouraging statements I have heard in many month came from this man when he told me that although the Sino-Japanese conflict has entered its third year, his company has not dismissed a single employee, although salaries were cut. This, however, he explained, does not work hardship on the individual because his lodging and food are provided by the company and with his salary paid in foreign currency, everything is in his favor. This condition, that foreign companies have not decreased their staff in China, is significant, for it means that the company views with optimism the possibility of resuming business in near future. The much publicized rumor, that Japan is closing the Open Door of China to Third Powers, is a myth as far as actual business firms in China are concerned.

My friend survived the greatest tragedy of the Sino-Japanese conflict, as he put it, the burning of Changsha by terror-stricken Chinese soldiers.



Bishop A. A. Gilman, Head of the Episcopalian Missions of the Yangtze tri-cities with some members of his flock and the writer (standing left)

Chinese boys is ten cents regards of amount of bill). No wonder, Sailor Pinky has the last word in any Hankow "spot."

For the upper-crust foreign civilians of Hankow, there is the Hankow Race Club, a million dollar park on the outskirts of Hankow untouched by the hostilities. The club has almost every form of recreation for its opulent members including polo, riding, golf, tennis, lawn bowling, swimming, bridge, and dancing. This exclusive club has numerous Japanese members who are being taxed as others \$100 for membership fee, \$18 per month dues and members monthly bill for drinks and incidentals average \$300. Ritz is the word. Characteristic of foreign controlled clubs in China, the Hankow Race Club has warnings on its premises which read: "No amahs (Chinese female servants) allowed on premises except in

Describing the tragedy, he pointed out that when rumors reached Chinese soldiers in Changsha that Japanese were advancing toward the city, terror-stricken soldiers mobbed the city hall, shot the mayor and numerous other officials, dynamited large buildings and set the city on fire. Changsha was built after a plan suggested by someone who had studied architecture abroad, for high walls were built every so many blocks to prevent fires from spreading in an event a small fire broke out in one neighborhood. Unfortunately, when the Chinese military set fire to Changsha, it was not lit in one place but in numerous parts of city, thus as the fire spread very rapidly, thousands of innocent citizens and refugees were trapped within the walled city resulting in mass cremation of human beings and complete destruction of the once prosperous river port. Foreign gun-boats were able to rescue the handful of foreigners caught in the blazing inferno, who otherwise would have met the same fate as the Chinese refugees. As our interview meandered from one subject to another, we came upon the much publicized accusation of indiscriminate bombing by Japanese bombers on Third Power properties.

Who is to Blame?

Company godowns (warehouses) and barges had been hit while several were completely destroyed. But that is to be expected, he admitted, they, being located right at the scene of the fighting. To expect them to survive the battle without damage is height of optimism.

I then cited the case of the Jardine, Matheson Company (British Shipping Syndicate) godowns in Kiukiang being used as a Chinese fort after the British evacuated, posting huge British flags on the walls of the compound. Even in this case, when the Japanese naval landing party made a dramatic landing in face of the enemies, they were quite ignorant that several of their men were killed by shots that were being fired from behind the British compound until the battle was won and an inspection corps discovered the godowns to be a well fortified military defense used by the Chinese.

However, my friend pointed out, the great majority of complaints and protests come not from representatives of business enterprises in China, but, missionaries and would-be humanitarian volunteers serving war refugees.

I asked for his candid opinion in regards to missionaries filing protests against the Japanese military. He smiled and then crouching forward, resting his two arms on his knees, he began :

"In the first place, in spite of warnings not only by the Japanese, but also by their respective governments, these missionaries remained to 'face' the dangers threatening lives and properties within the sphere of war. If these missionaries are what they claim to be, practical and self-sacrificing servants of victims of war, what right have they to complain, protest, and spread hatred toward the other side because they are caught on the opposite side? In other words, they are prejudiced. I know that if they were on the Japanese side and the same thing happened, they would protest against the Chinese. War is such . . . they should know it and expect it."

"Aside from that, in my personal experiences with missionaries in China, I know that in so far as they may have good intentions, actually they fall short of expectations. Once I asked an aged missionary who had spent more than forty years in China how well he was acquainted with the native and if he understood their nature. Said this missionary: 'During the first five years, I thought I knew them very well; then after ten years, I became dubious of my understanding the Chinese people; and after 20



Staff officer, Lieut.-Commander Ishikawa on board the flagship "Ataka" at Hankow

years, I gave up altogether . . . you can never tell about them!'

"But I'm not the only one who feels that Christian influence in China is despairing. Confidentially, many large, influential foreign firms in China have a definite policy not to employ applicants who proudly present themselves as Christian converts."

Realizing that the interview with the businessman was pretty much a one-sided affair, I sought to obtain an interview with one who can present the other side of the picture, so to speak. Yes, I'm an American. I believe in giving the "other fellow" a chance.

For Members Only

And luck was with me, for I was introduced to Bishop A. A. Gilman from North Platte, Nebraska, now in charge of the Episcopalian Churches and Missions in the tri-cities of Hankow, Wuchang and Hanyang. The headquarters, located in the area under Japanese jurisdiction, consists of an office building, dormitory, several school houses, and chapel. A man, perhaps in his late fifties, Bishop Gilman is a modern version of the early California Fathers, thin, not too tall, white haired. In our conversation, I noticed that his English had "stagnated," that is, having been in China so long, he was speaking "pidgin" English unconsciously.

Led into his study, I was impressed by the furnishings: one table radio, another powerful short and long wave receiving set, an up-to-date electric radio, library of classic Victor Red records, and also shelves of valuable books from America.

When we were comfortably seated, I inquired as to the activities being carried on by the mission under the present circumstances. He answered, "The mission's social service among the Chinese was given only to members of the mission, which in number does not exceed two or three hundred in Hankow." What of help in feeding and clothing war refugees? Again he answered. "The mission at present is serving its members only."

Opium for the Pipes of China

Knowing that most of the information regarding the dope situation in China has been coming to America via missionaries, I questioned Bishop Gilman on the subject of dope.

Since the victory of the British in the shameful First Opium War of 1843, the insidious drug was introduced and forced upon the illiterate masses, with astounding rapidity and the traffic in opium engulfed China, enslaving the masses under its degenerating,

demoralizing influence. In more recent years, opium has been the chief source of revenue for corrupt government officials. At one time, Generalissimo Chiang Kai-shek made an attempt to bring the dope situation under control by sentencing addicts to death. But this was short lived, even with the initiation of the New Life Movement, Chiang depended upon opium revenue for financing his large army and purchasing armaments from abroad, Bishop Gilman disclosed.

"Hankow was flooded with opium and the illicit traffic in the drug was carried on openly by officials of the Kuomintang. When the Japanese occupied Hankow last October, addicts were suffering from want of opium. A serious dope problem confronted the Military Special Service Corps. Denial of opium meant exposure of innocent refugees and civilian Japanese to crazed addicts. The only temporary solution was to supply them with the drug. However, it is an unjustifiable misconception and error to accuse the Japanese of being responsible for initiating the drug traffic and habit among the Chinese already under the influence of opium."



Kiyoshi Miura, popular attache at the Japanese Consulate in Hankow

And I knew that elsewhere, whenever the Japanese encounter the opium problem the Military Special Service Corps systematically studied the situation and began to bring the matter under control. This was usually done by supplying merchants who were registered with the Japanese authorities and who in turn registered each customer, thus making a reliable record of those buying and selling opium.

The hopelessness of trying to bring the opium problem under control can be gathered from Bishop Gilman's own experiences in trying to reform addicts. He cited many instances including several which concerned a church member enticed to smoke an opium pipe and very shortly became a hopeless addict and out of control. "And I have given up trying to 'save' them," he said.

I learned also from the Bishop that there are many opium stores and smoking places in Hankow. I questioned him further as to where they may be found and how. He wrote on a slip of paper several Chinese characters saying: "These signs mark the store and building, you'll have no difficulty finding it." The Chinese characters written were *tu gao* for drug store, its literal meaning is earth (dope) ointment and *jsu chih chu* for dope den, literally meaning: sell smoke place.

Later, the information received from Bishop Gilman aroused my curiosity and getting on a ricscha, I started out in search of these two places. I let the ricscha puller read the slip of paper, but he couldn't read, so we stopped at a Chinese store and asked the merchant to read it and direct us to it. The merchant spoke to the ricscha puller and we were off . . . through long narrow, crowded streets and alleys that smell like every pedestrian hadn't taken a bath in a lifetime. The ricscha quickened his pace and shouted at everyone to get out of the way . . . finally he came to stop before a fairly large store with nothing in it, although several men stood behind counters. I stepped in bravely, holding the slip of paper with Bishop Gilman's Chinese characters on it. The man reached under the counter and tossed a small paper bag with numerous Chinese characters on it. I stared at it blankly for a moment, wondering what I should do about it. The man seemed to be puzzled over me. He also seemed to be wondering what to say or do. Then he suddenly barked: "20 sen," In Japanese to me. As if I were hypnotized by his brassy voice, I reached unconsciously into my pocket and produced some money. He gave me change, the ricscha puller interrupted and turning the paper over asked the man at the counter something in Chinese. The man pointed down the street, the dusty coolie signalled for me get back on the ricscha, which I did without saying a word. Again we were off . . . the ricscha stopped in front of a house whose door was painted green with Chinese characters in red marked the door panel. The ricscha man smiled victoriously as if to say: "Trust me, I can take you anywhere." He pointed to the door and uttered something which probably meant: "Go on in!"

I pulled up my trousers, heaved a deep sigh and bravely walked into the green door which was partially open. It was rather dark inside, but instead of the darkness, the pungent smell irritated me. I was determined to find out what this place looked like and how things are done. Strange, nobody around. Can I be in the wrong place? But as my eyes became accustomed to the weary darkness, I noticed that I was standing in a short hallway with several doors on either side with long curtains hanging over the door making it impossible for me to see what was inside the adjoining room. Stepping closer, I heard voices inside. Slowly, I cast the curtain aside and peeked in. Yes, I was in the right place! Inside were beds side by side like cow stalls in a barn. In a single bed-like stall were two or three men and in one of them a single woman, all half dozing or unconscious: however conscious enough to hang on to a long, heavy opium pipe. Someone poked me from behind. I gave a jump as I clinched my fist and turned around. An elderly woman was smiling at me as she began to speak to me in Peking dialect (Hankow natives speak a dialect similar to Peking dialect and altogether different from the dialect used in Shanghai). I shook my head. A man entered the scene and placed a book



The Hankow Race Course, favorite outdoor rendezvous of residents of the port. It is located north of the former German Concession, and beyond the tracks of the Peking-Hankow Railway

before me, holding a brush before me at the same time. I looked into the book. Although I couldn't read it, I gathered that he wanted me to sign it or register me. I again shook my head. Then taking a scrap of paper from his pocket, he wrote several Chinese characters on it. Unable to read it, I accepted it, stuck it into my pocket and stepping back slowly, I managed to say: "Memencho, memencho . . ." and rushed out of the place. The ricscha was waiting for me outside. Boarding the ricscha, I shouted: "Ossoh, ossoh!" The ricscha was speeding down the street at full speed. By the way, these two Chinese words I used are among few Chinese I have picked up, whether it is Peking or Shanghai dialect, I'm no so sure. But I do know that they mean: "Wait" and "Hurry."

Upon reaching my hotel, I asked the girl-servant to read the slip of paper I had. She read it once and then again . . . her face turned red, evidently, she was very embarrassed and finally she managed to ask: "Where did you go? Was she nice?" And it was my turn to get red in the face and blush. Say, she's got it all wrong! I asked her, what does it say on the slip of paper. "Better rooms for special guests. One dollar for two and no time limit." Ouch! Her imagination was running wild. I explained to her the adventure I just had in visiting an opium smoking den. Evidently, being a Japanese, they offered to let me have a cleaner room than used by the Chinese smokers. Two for one dollar probably was in reference to two small packages of opium to be smoked for one dollar and plenty of time to smoke them. Well, it was an experience and now I'm satisfied. I know now that Bishop Gilman was right and as he said, the Japanese are not guilty but this has been going in China since 1843 and even Chiang Kai-shek had permitted it as a source of revenue to finance his army and war . . . inspite of his Christian leanings.

Incidents Behind Headlines

One thing that Bishop Gilman mentioned with great deal of pride and that is, he had never had cause to have a disagreeable experience or "incident" with Japanese soldier or official. The reason for this, he explained, is to meet them half way. Neglecting this would cause friction and misunderstanding between the two parties. And one other thing, respect all rules and regulations as enforced and executed by the authorities in charge. Bishop Gilman cited an instance of a missionary who recently arrived from the United States, who drove an automobile through crowded streets at forty-five miles per hour while the regulation is twenty-five miles per hour limit. Furthermore, the missionary completely ignoring the sentry on duty; while it is customary to acknowledge a sentry on duty by simply lowering the head, a slight bow.

Perhaps the case of Petty Officer Baker from the U.S. Gun-boat *Guam* which occurred here in Hankow just few days ago is a typical

example of how an incident is aroused. Undoubtedly, American newspaper sensationalized the story with banner headlines.

Staff Officer Lieut.-Commander Ishikawa of the flagship of the Yangtze River patrol gave me an official report regarding the case.

On July 22, at about 5.00 p.m. in broad daylight, Petty Officer Baker was entering the Japanese occupied area of Hankow from the French Concession against the regulation directing both vehicle and pedestrian traffic. Everyone respected the regulation and walked the street accordingly. When he was passing a Japanese sentry, the sentry asked him to cross the street before entering the Japanese occupied zone, according to regulation. Baker ignored the request and walked closer toward the sentry, who held his bayoneted gun in front of him intending to block passage. Baker then grabbed the gun which resulted in a scuffle. As the sentry tried to regain his rifle, Baker struck the sentry and both fell to the ground. A Japanese army officer and several seamen came upon the scene and put a stop to the fight. Baker and the sentry were slightly injured and the two were rushed to a navy emergency hospital where treatment was rendered by Japanese doctors. Because Petty Officer Baker was an American, the Japanese authorities were lenient and in spite of Baker's admission that he was walking on the wrong side of the street, had grabbed the sentry's gun and had given the first blow . . . no written confession of his misconduct was required. Moreover, the Japanese released him with the idea of localizing the incident and keeping it out of newspapers. The following day, a bombshell was received by the Japanese naval authorities in form of an official protest from Admiral Hart, Commander-in-chief of the American Asiatic Fleet in Shanghai, demanding an apology and punishment for the sentry. Undoubtedly, Petty Officer Baker had fabricated his version of the incident to his superior which aroused indignation against the Japanese. Or was it another case of "face-saving?" The Japanese hoping to maintain friendly feeling between the American and Japanese navies which has been traditional, exchanged several telegrams giving the facts of the case as recorded immediately following the "incident" as acknowledged by Baker, although the Japanese did not force Baker to sign the statement before his release. Later, the Japanese naval authority in Hankow received a telegram from Admiral Hart expressing a desire to close the regrettable incident following new facts brought to light upon the matter revealing the responsibility on both sides for the unfortunate consequences.

I can imagine newspapers back home playing up the incident in all its glory, not one giving a thought toward amicable relation between the navies of the two powers involved. Maybe some people are shouting for "revenge" and "they can't get away with it, the Japs!" If only people back home can read the communication exchanged by the Admirals of American and Japanese flagships.

Newspapers that sensationalized the Baker incident would be enlightened—perhaps.

Here's hoping truth is able to keep in step with March of Time!

Mr. and Mrs. Japanese-American

One of the most popular characters in the Japanese Consular service in Hankow is a native of California, Mr. Kiyoshi Kay Miura, an American of Japanese ancestry, Young Miura, for he is still in his twenties, is serving Consul-General Hanawo as special attaché handling matters concerning Third Power Nationals and Interests. Consequently, the number one man for all English speaking foreigners in Hankow and the Japanese authorities.

Born and educated in San Jose, California, and receiving his primary and high school education there, Miura realizing the advantages of having a Japanese education, went to Japan and acquired a Japanese education at Meiji University in Tokyo. His knowledge of both English and Japanese is recognized by officials of the Japanese Foreign Office. His services were enlisted in 1938 and upon the fall of Hankow, he immediately was sent there as go-between to negotiate Japanese and Third Power differences. Although serving the Japanese Government, Miura is American in every sense of the word. One moment, a word, expression of his thoughts and conduct is typically American and undoubtedly, these American characteristics are winning over the admiration and respect of practically every foreigner in Hankow and vicinity.

But Kiyoshi Miura is not hoarding the honor selfishly alone in this isolated frontier far from home and friends. He is sharing it with another American . . . his wife, Mrs. K. Miura, nee Toshiko Tommy Asakura of Santa Barbara, California . . . also a so-called "second jenny" (second generation Japanese-American). Although her winsome personality has placed her in top ranks among the socialites of Hankow Race Club she is very much American in the fact that she is a volunteer secretary to the Consul-General and her husband.

The Miuras in Hankow are worthy representatives of so-called "Nisei," second generation Japanese born in America. Their courage guided by an indomitable spirit and will to "go places in this world" has brought them miles from home and friends . . . winning esteem and setting an example for all the Nisei. They are proving to their friends that good comes from within and is not calculated by how much is written on their pay-cheek.

Hankow certainly has been worthy of every minute I spent there . . . My eyes have been opened to many new facts contributing toward further understanding of the Sino-Japanese conflict . . . In leaving Hankow, I hold implicit faith in the final outcome of the present hostilities as that which will contribute toward world peace in spite of the troubled conditions throughout the cock-eyed world. And so I close this letter from Hankow with regards to all.

Less Coal, More Power

PUBLIC utility power plants now require close to 50 million tons of coal annually for their operation, but that amount is only half of what would be needed by equipment of 20 years ago in producing the same amount of electricity, W. E. Blowney, turbine engineer for the General Electric Company of New York, told graduates of the U.S. Naval Academy. Improvements which have doubled the energy output or halved the fuel consumption of the steam turbine during the past two decades were described.

An average 30,000 kilowatt steam turbine plant in 1918 required about \$3,500 worth of coal for each day's operation, whereas the daily coal bill of to-day's turbine of the same size is only \$1,450 for producing the same amount of electricity, according to Mr. Blowney. The "best" 30,000 kilowatt station of 1918 daily consumed \$1,670 worth of coal as compared to \$900 worth for operating the most efficient and modern type plant of that size to-day, he said.

"These are tremendous economies when you consider that the public utility industry each year spends in the neighborhood of \$100,000,000 for fuel alone," Mr. Blowney said. "Primarily responsible for the savings are the higher initial steam pressures and temperatures which have been permitted as a result of the advances made in turbine design and construction over the past 20 years."

Much of the improvement in power generating equipment was attributed to a better understanding of the properties of alloy steels. Metal "creep"—the extension or relaxation which occurs with changes in temperature—was one of the most difficult problems to cope with in turbine design, it was explained.

"Creep takes place in modern turbines but it is rigidly controlled, and present high-temperature alloy forgings are as good for 800 to 950 degree Fahrenheit temperatures as earlier carbon steel castings were for 600 to 750 degrees," Blowney stated.

Most present-day turbines are made to operate at higher speeds, which in addition to improving efficiency has also permitted reductions of approximately 50 per cent in the size of the units over the past 20 years, he explained.

"The rapidly increasing use of hydrogen cooling for turbine generators represents another big advance in the power industry and has permitted units to be built which will operate more efficiently in larger sizes and at higher speeds," asserted Mr. Blowney.

Since 1937, turbine generators of the hydrogen-cooled type representing a total generating power of more than 1,000,000 kilowatts have been installed or are under construction by General Electric, he said.

“A Window to the World”

Gdynia—the Biggest Port on the Baltic Sea

By Dr. J. J. PELCZYNSKI

The following article written some months before the outbreak of hostilities in Europe has special interest at this time, for it presents details regarding the Port of Gdynia, which was converted by Poland in the past decade and a half from a fishing village into the main port of the country.

* * *

WHEN the writer was travelling from Montreal to Halifax in Nova-Scotia, the train had to pass through a corridor . . . a corridor twice as large as the famous Polish corridor . . . and one thought of the absurd idea of a war between Canada and the United States. A much bigger absurdity occurs when anybody thinks about the free access to the sea for a nation of 35 million people through its own territory, inhabited ethnographically by the same race, and that it might lead to war.

Let us see what is at the end of the corridor, how the economic importance and justification of the Polish “window to the world” looks.

On regaining free access to the sea, Poland was empowered at the same time to make full use of the Port of Danzig. Everybody was aware that this port alone could not suffice for the needs of the country, both in view of the expected increase of sea borne trade and restrictions imposed on the movement of Polish trade and industry, by passing through the free city of Danzig. This assumption fully materialized in a very short time. Inasmuch as future trade was concerned, it was justly argued that for the State, which in those days had over 27 million inhabitants, with the population rapidly increasing, one port, relatively small and out of date, would not be sufficient, the more so, since it was necessary to take into consideration the possibility of an expansion in transit from and to neighboring Baltic States.

How this idea was justified can be seen by the trade turnover which has given work to both ports: Gdynia and Danzig, adequately employed with a three-fold increase for Danzig, as compared with the pre-war period.

The idea of constructing a Polish port, in the place where there was only a small fishing village, gained acceptance owing to the fact that Gdynia showed considerable natural advantages of easy access from the sea, protected by the Hel peninsula, in an area free for building expansion.

Since the day when the Polish Parliament, in April, 1923, requested the government to start building the port, fifteen years have elapsed. Has any work been done during that time?

When one looks at a few total turnover figures, one can see that in the first five years of the port's history, i.e.—in the period of organization, the trade has risen from nothing, to just under a million tons in 1928. It was, however, only at the end of this period, that the construction of the port actually started. The most intensive work, the main scheme of construction, has been completed in the second period, during which the turnover of goods continued to rise, reaching some five million tons per annum. The last five-years period, during which the turnover of goods rose to some

nine million, was that of the installation of port equipment, as well as that of an industrial and commercial apparatus, and the rapid extension of the town, the population of which reached 120,000.

The port of Gdynia is now the largest port on the Baltic, in respect to the total of sea-borne trade. It covers an area of 3,500 acres, with a water area of 700 acres. It consists of an outer port with an avant-port, three large basins, a small sailing port, an internal traffic port, together with a timber port.

Pilsudski's basin is mainly used for overseas trade, bearing in mind that here raw materials, coming directly from producing countries are transhipped. The Minister Kwiatkowski's basin is the free-port zone, with the United States, Czechoslovakia and Roumanian quays. At the south-west terminal there is a timber port.

In the internal port, the basins have been formed by passenger, coaling, fishing and southern piers. The passenger pier, called the French Quay, is mainly used for emigrants and overseas travellers. The Dutch, Danish and Swedish Quays form the coaling basin which also deals with ores and metals. The loading of export coal is effected from the Silesian Quay of the coaling pier. The

President's basin concentrates the movement of fishing vessels and covers intercoastal movement of passengers and goods.

In respect of technical equipment continually increasing, Gdynia can at present cope with all the steadily growing traffic. The total length of quays amounts to 12,500 meters, with 185 km. of railway line in the port.

On the Danish Quay are the bunker coal deposits, the oil fuel bunkers with an adequate tankage for oil fuels and lubricants. In order to extend bunkerage at the port of Gdynia, special ships have recently been bought, which makes it possible to tranship bunker coal and liquid fuels to any part of the port, presenting a considerable convenience for ships passing through.

The port equipment to-day consists of 80 cranes of various types, a large increase as compared with six cranes in 1929. Mention should be made of the special coal transveyors for loading car loads into belt conveyors. Each belt can take up 650 tons per hour. The whole is equipped with automatic weighing machines. There are several bridge-crane of 25 to 50 tons respectively.

For the storing of goods the port of Gdynia has some 50 warehouses, all modern and well equipped. Several of them are of great importance for the traffic. For example, the cold storage, the largest in Europe, is capable of holding 1,200 wagons of perishable goods. This store has its own special cranes with closed containers, permitting the transport of goods from the ship to the store without a change of temperature.

Another interesting feature is the grain elevator, capable of storing up to 10,000 tons of grain, equipped with all modern cleaning apparatus. The port also has an oil cake mill and a rice husking mill, equipped with silos and stores. Apart, in the free customs zone, there is a large cotton store. The concentration at Gdynia of almost the whole Polish import of cotton, necessitated the

(Continued on page 390)



Loading a vessel with coal with modern automatic machinery on a Gdynia pier

The Construction of Breakwaters

By STANLEY C. BAILEY, ASSOC.M.I.NST., C.E., F.G.S.

(*The Dock and Harbor Authority*)

BREAKWATERS are usually required for one or other of three purposes. One is to form a harbor of refuge for ships in stormy weather, so that they may lie safely at anchor within the area bounded by the breakwater; another is to protect the mouth of a seaport on the side on which the worst storms occur; and the third is to protect river channels at their sea mouths which lead to an inland port.

At the mouths of estuaries and rivers, sand, gravel, and mud banks are formed by the materials carried down by the rivers, and also by the drift of the sea currents and waves along the coasts which carry the materials from one part of the coast to another, and deposit it in the estuaries. These banks block the channels, which must be kept open by constant dredging to enable ships to navigate them safely at high or low water according to the exigencies of the Port. Consequently to avoid the expense of continual dredging, the width of the entrance to the river is reduced by constructing two parallel solid piers from 500 to 1,000-ft. apart into water from 25 to 30-ft. deep at low water; these act as training walls, and the reduction in the width of the entrance produces more rapid currents which scour the shoals between the piers and drive them seawards. The further the piers or breakwaters are carried out into deeper water, the further are the shoals or bars pushed forward and reduced in height.

To carry this process out effectually, it is important that the outer ends of the piers should be in comparatively deep water, but what effect solid piers and breakwaters will have eventually on a harbor entrance is difficult to determine, unless experiments have previously been made with a working model, for the coastal currents in the vicinity are changed in direction as the piers or breakwaters progress seawards, causing new bars to form in unexpected places, the shoals and currents across the entrance making it more difficult for ships to navigate. Occasionally the currents are so strong that vessels are swung round when making the entrance and collide with the pier.

The earliest artificial breakwaters consisted of rubble stone or pierre perdu mounds standing several feet above high water level, and built up by manual labor working from the shore seawards. These gave protection to ships from rough seas, provided the entrance between the breakwaters did not face the direction of the severest storms, but gave little shelter from driving winds, waves, and spray passing over the breakwaters, and because of the small sizes of the stones, these structures became denuded on the sea side, and required constant repairs. The waves not only tore down the outer slopes to flat angles such as slopes of one in five or one in six, but also pitched the stones into the harbor. In breakwaters of this type it has been found necessary to protect the outer slopes with large stones and concrete blocks weighing from 20 to 30 tons, and to place heavy stone pitching on the slopes, with thick concrete paving over the top, and eventually to erect a mass concrete superstructure on the mound in some instances. In cases of exposed harbors, where there is a comparatively large range of tide, and it is necessary to keep the harbor scoured, two entrances are formed, with a detached mole between them, or a single entrance is left at one end of the mole, and a bridged over gap at the other end. These openings enable the currents to circulate in the harbor and scour the bed. In some cases where small rivers flow into the harbor, the water in them is held up by sluices, which are opened when the tide is low, thus assisting the scouring of the harbor. Double entrances also provide safe alternate entrances for vessels during storms.

Detached moles are constructed by means of hopper barges with hinged bottom doors, so that the rubble can be deposited, but when the mound reaches such a height that the barges can no longer pass over the mound, the stones are handled by cranes mounted on barges, and deposited by tipping buckets or skips with hinged bottoms, the barges lying alongside the breakwater.

Rubble mound breakwaters are the least expensive to construct, but they cost more to maintain than the vertical wall form. Their disadvantages are that they do not give sufficient protection

to shipping, which cannot anchor or moor near the breakwater, and it is difficult to construct suitable foundations on the rubble mound for wharves and jetties alongside, unless expensive concrete or masonry walls are built. The entrances between the moles or breakwaters must also be wider than need be, because of the flat slopes of the mound, unless they are finished as in some cases with mass concrete or blockwork heads, or caissons filled with concrete.

When the rubble stonework is deposited on a thick bed of mud or quicksand at the bottom of the sea, the weight of the breakwater causes considerable settlement of the central portion which may be so much as 10 or 20-ft. This produces upheavals of mud and sand, in wave-like mounds on each side of the breakwater and so diminishes the water depth in the harbor. The settlement may continue for years involving continual maintenance and dredging of the harbor.

For the maintenance of the breakwater a permanent railway track is retained along the crest.

Breakwaters of this type are also constructed by means of a timber piled staging built from the shore on the line of the work slightly above the level of the breakwater top, carrying a railway, so that trains of tipping trucks can be run down direct from the quarry, or an overhead cable way transporter may be used for depositing the rubble.

In some cases, the mounds are begun by depositing dredgings of sand, gravel, and stones along the line of the breakwater to form a hearting, on which stones weighing about $\frac{1}{2}$ ton or 8 cub. ft. are deposited, and over these, stones weighing one to two tons or 16 to 32 cub. ft., with large stones or concrete blocks of 10, 20 and 30 tons on the sea side slopes laid pell-mell or in no regular order; in fact the more irregular they are arranged, the better they break up the waves. In cases where there are considerable depths of mud, and to avoid undue settlement of the breakwater, it is advisable to dredge a trench on the line of the breakwater, and fill it up with dredgings of sand, gravel, and stones.

The outer ends of the breakwaters or moles are provided with lighthouses and beacons well above high water level, constructed either of steel framing or concrete. The former offers the least resistance to the waves. On the shore two prominent landmarks or beacons with lights, one at some distance behind the other, are set up, in alignment with the center of the harbor entrance, to act as a guide for shipping entering the Port. The slopes of the rubble mounds may be so steep as one to one on the harbor side, but on the sea side they should not be steeper than three to one above high water, and five to one from high water to 12 or 15-ft. below low water level; below this they may be two to one and $1\frac{1}{2}$ to 1 to the sea bed. The width at the top of rubble mound breakwaters varies from about 20 to 50-ft., and the height above high water spring tides from 9 to 15-ft., but the higher they are built, so much the better, as breakwaters that are not carried up well above the highest spring tides simply acting as groynes, the seas carrying sand and shingle over the top, and depositing it in the harbor where it blocks the channels.

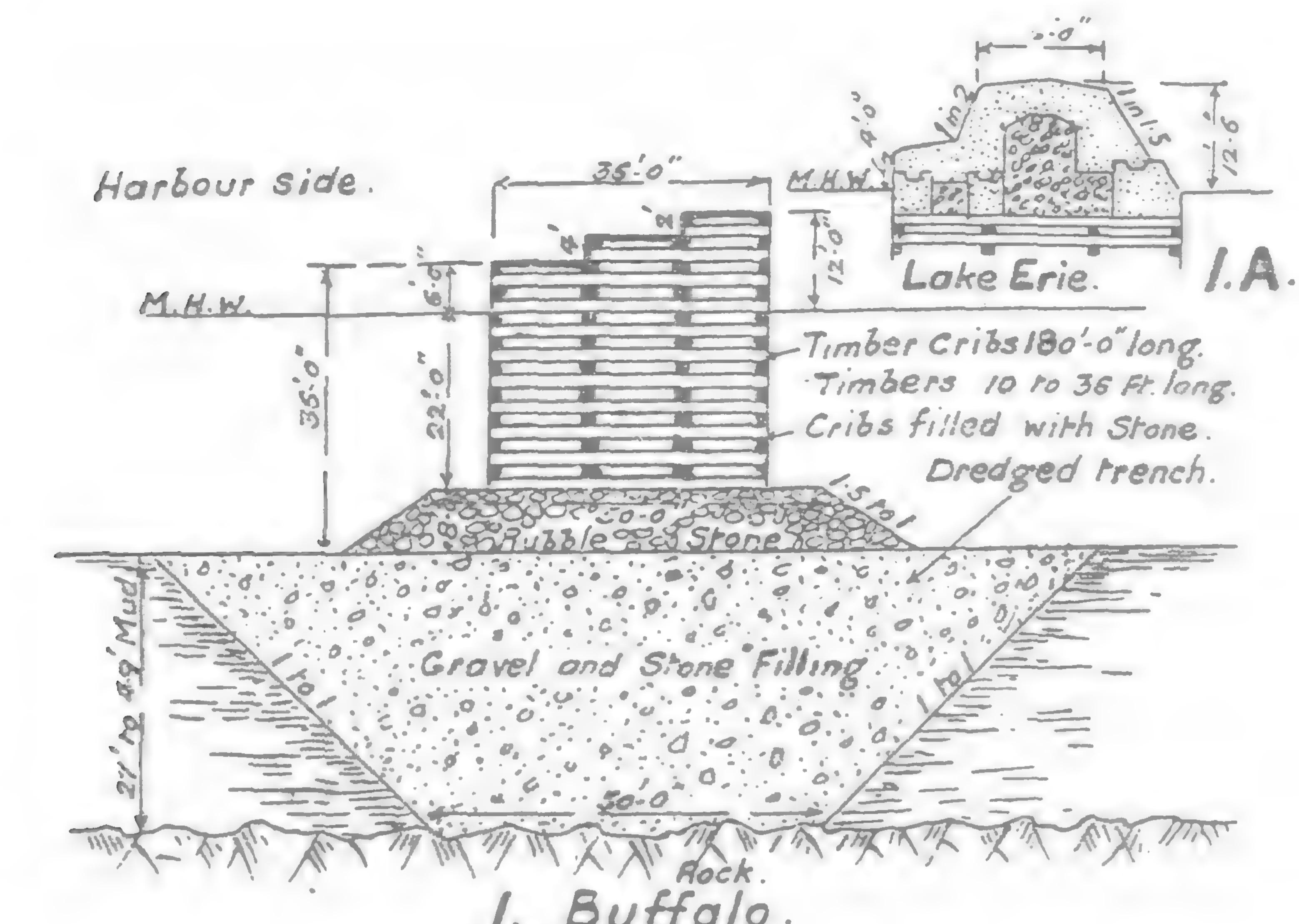
If berms or flat ledges are made in rubble mounds to break the long slopes, they should always be placed at a level of from 12 to 15-ft. below low water level.

Typical Examples

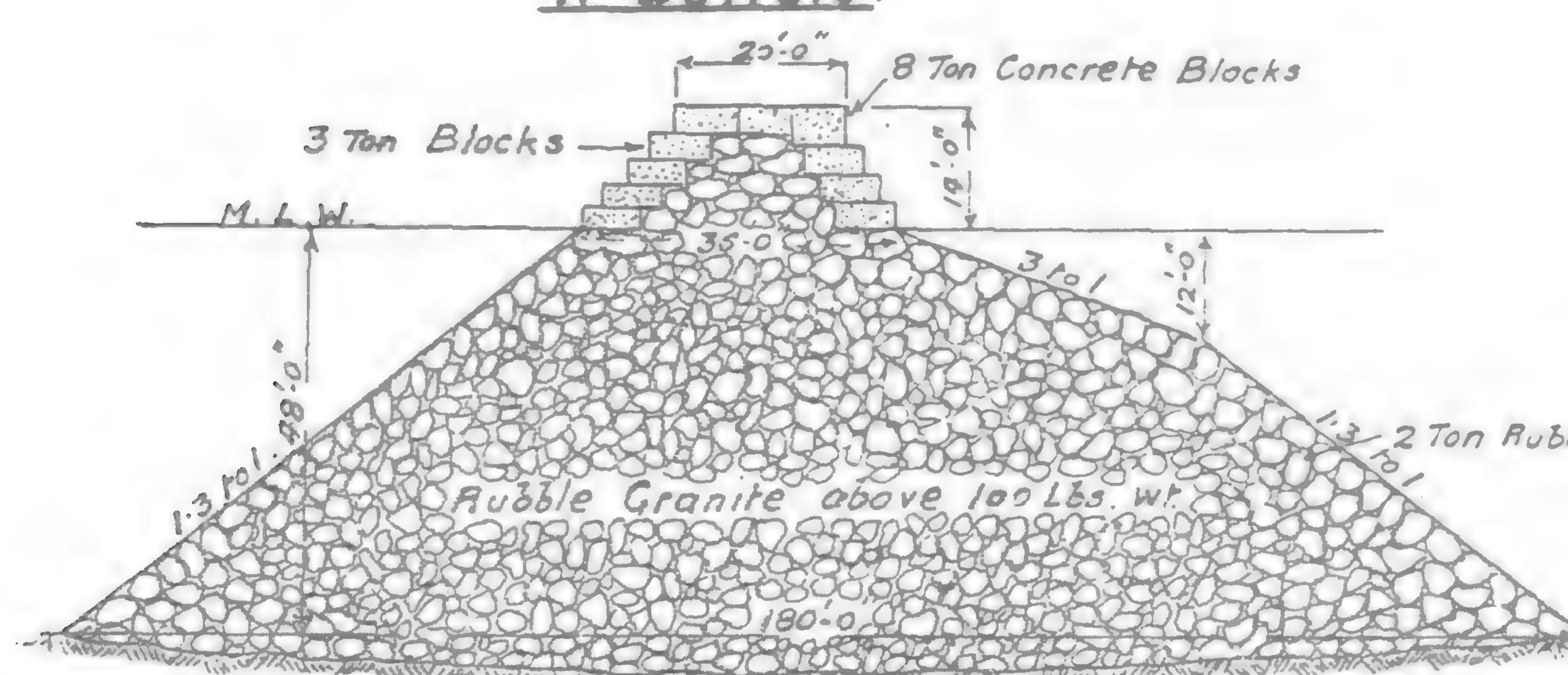
The diagrams in figs. No. 1 to 10 illustrate various types of breakwaters that have been constructed, and are self explanatory.

Some of the older types of breakwaters consisted of a rubble stone mound brought up to low water level and surmounted with a vertical masonry superstructure. This involves tidal work, and is a slow method of construction. Examples of this type are the breakwaters at Holyhead, Kingstown, Boulogne-Sur-Mer, Cherbourg, Oran and Algiers.

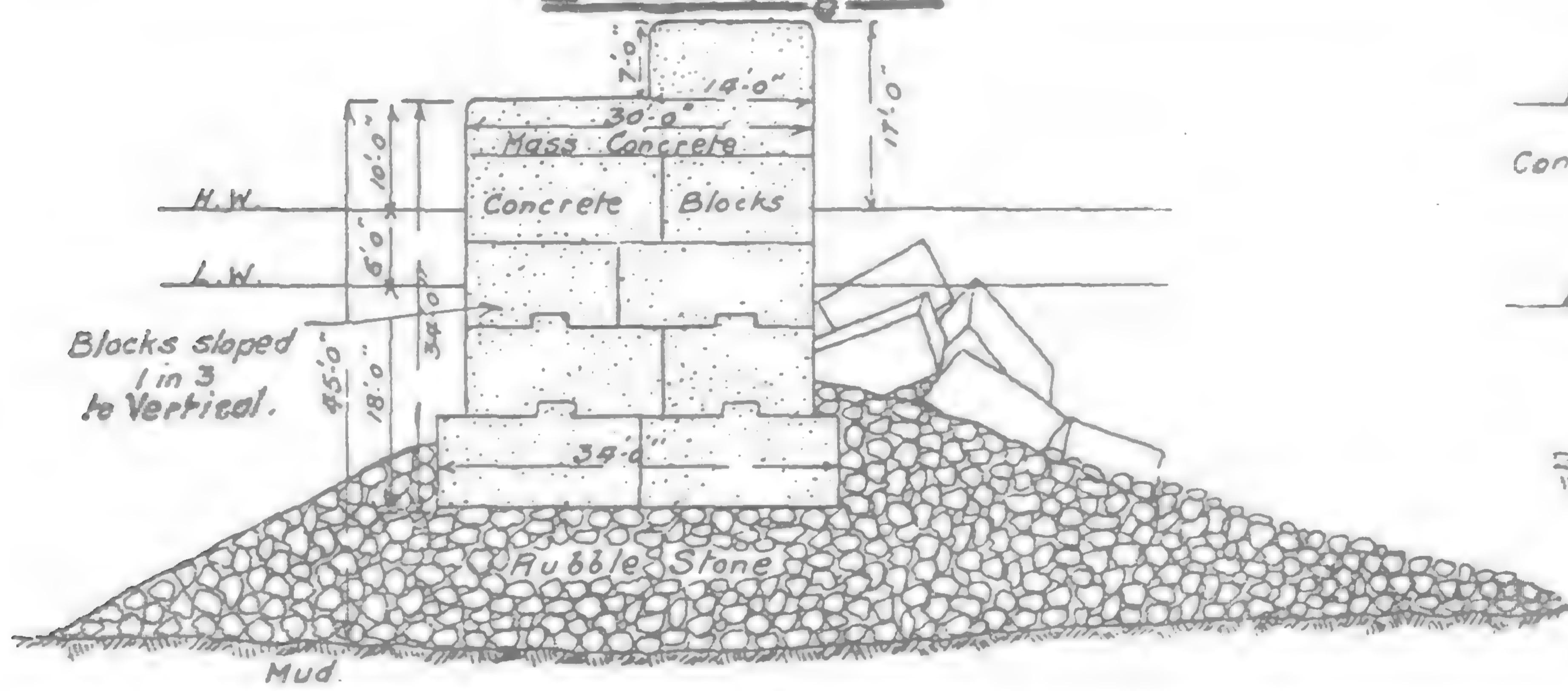
After the founding of the masonry superstructure slightly above low water level, the rubble mound was carried up on each



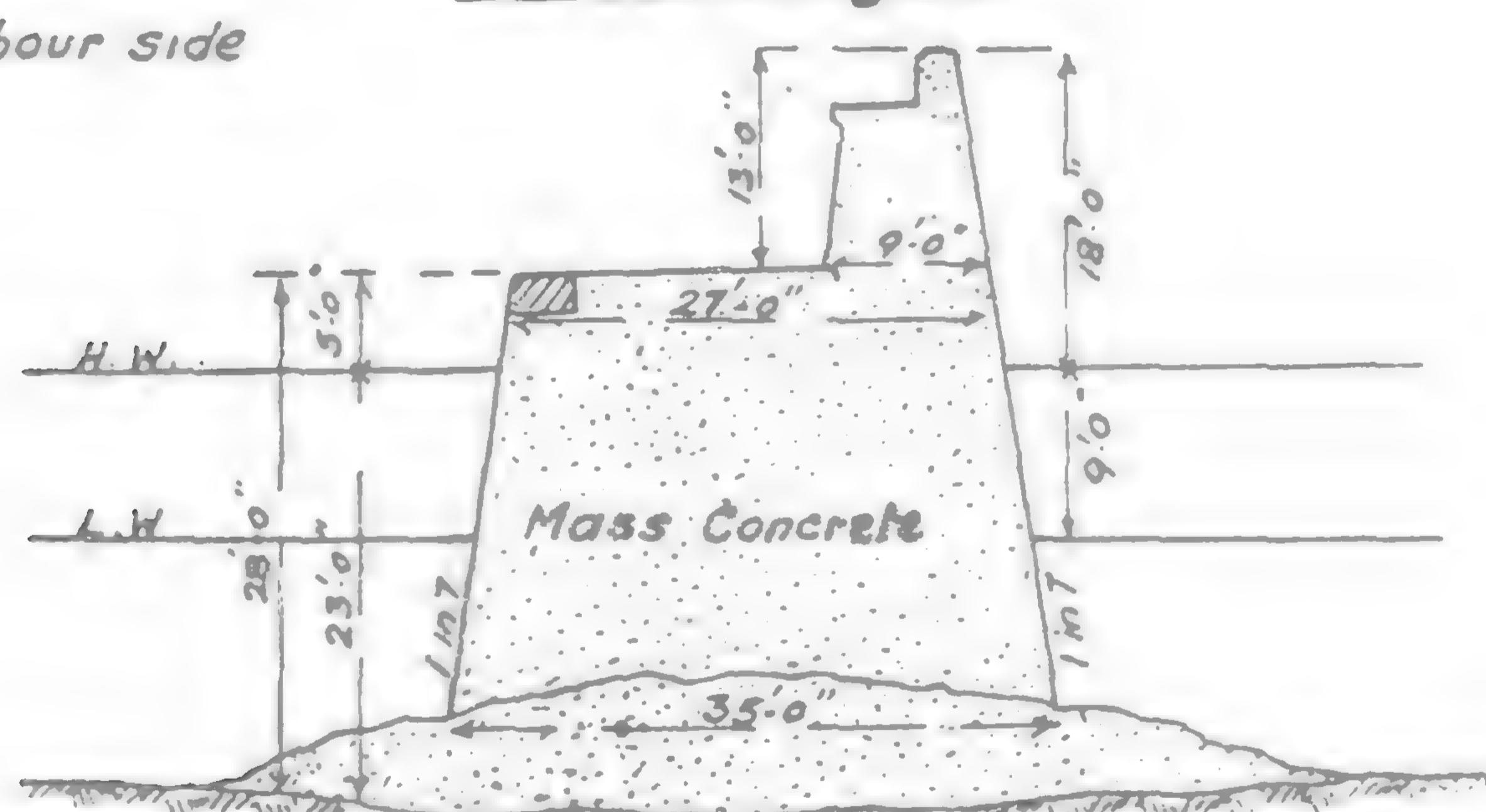
L. Buffalo.



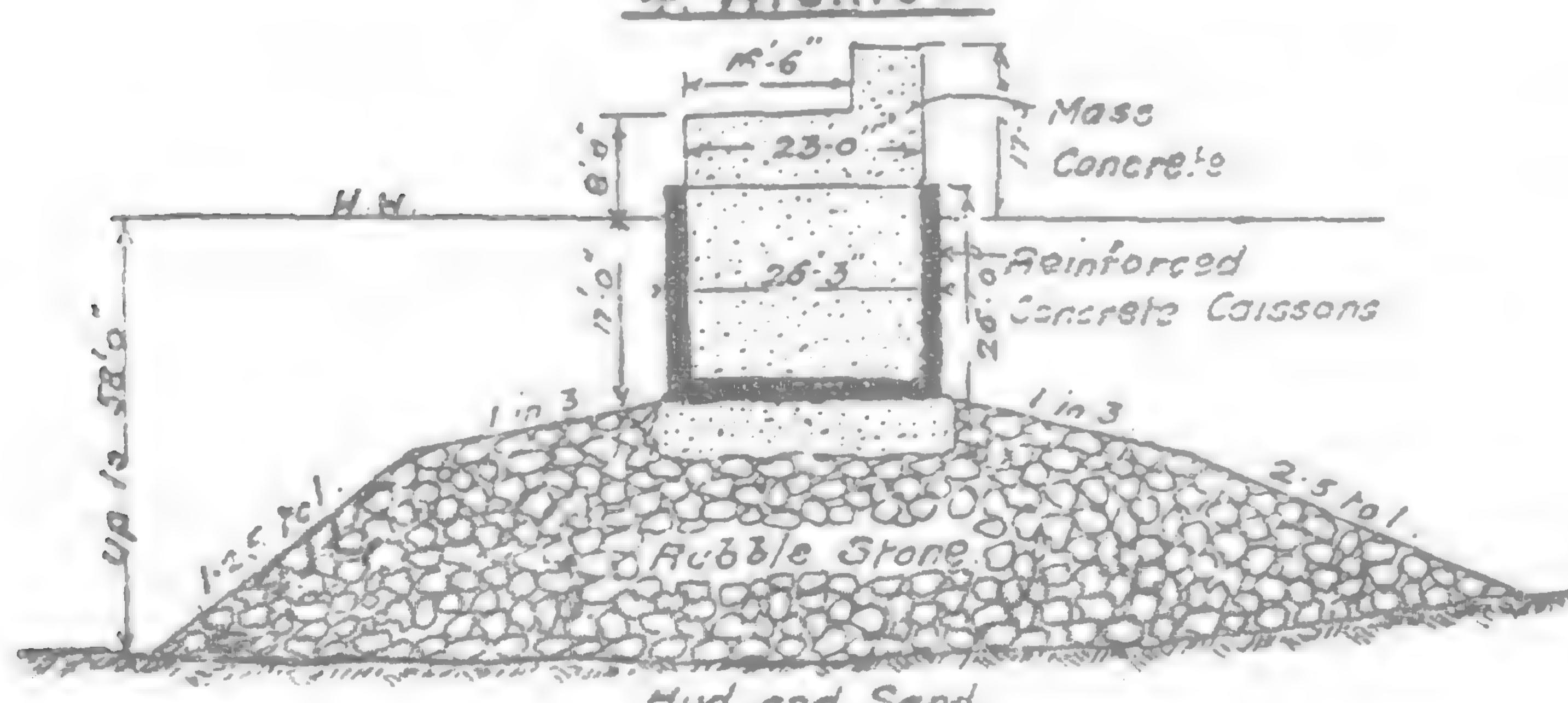
2. Los Angeles



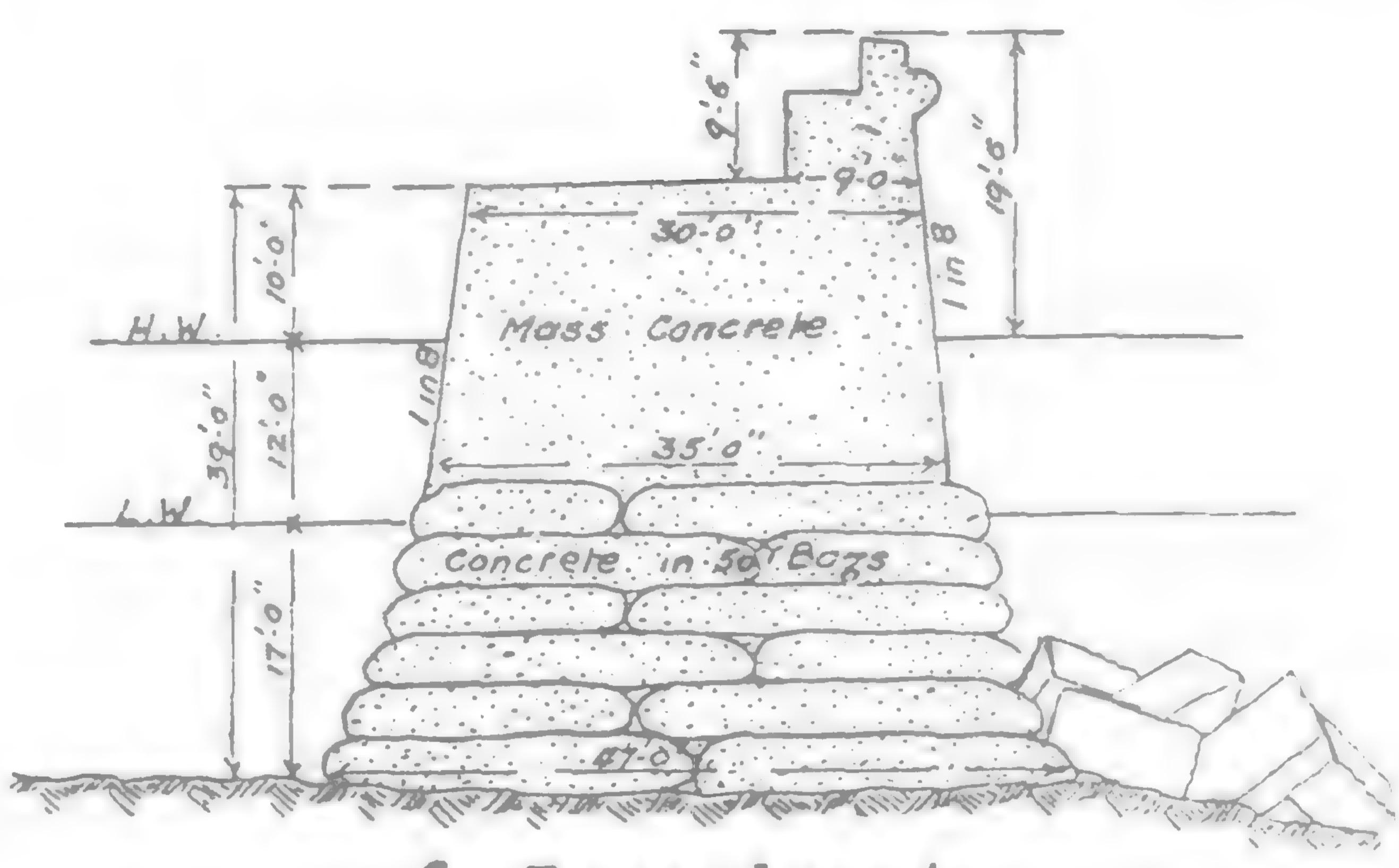
3. Mormugão



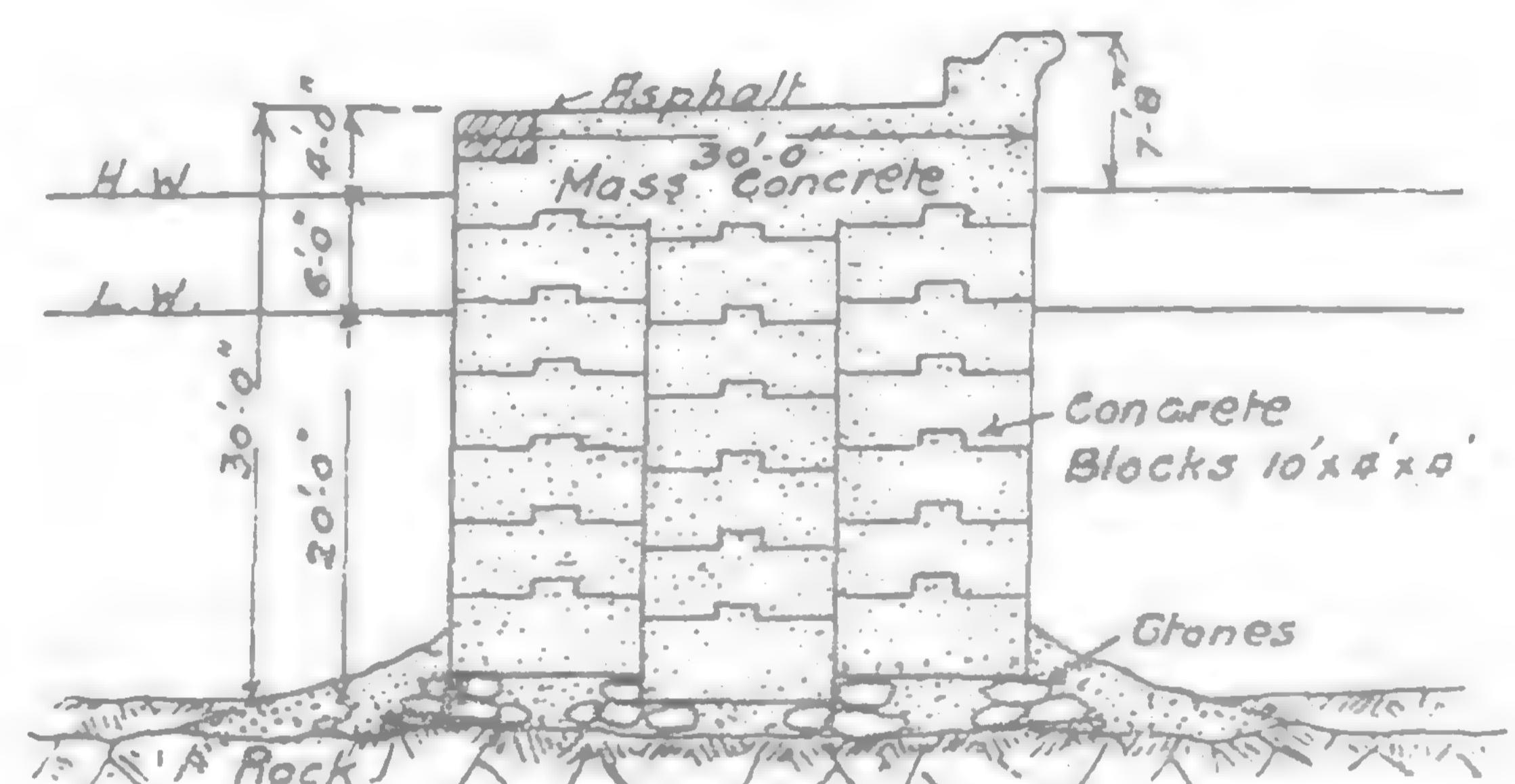
A. Wicklow.



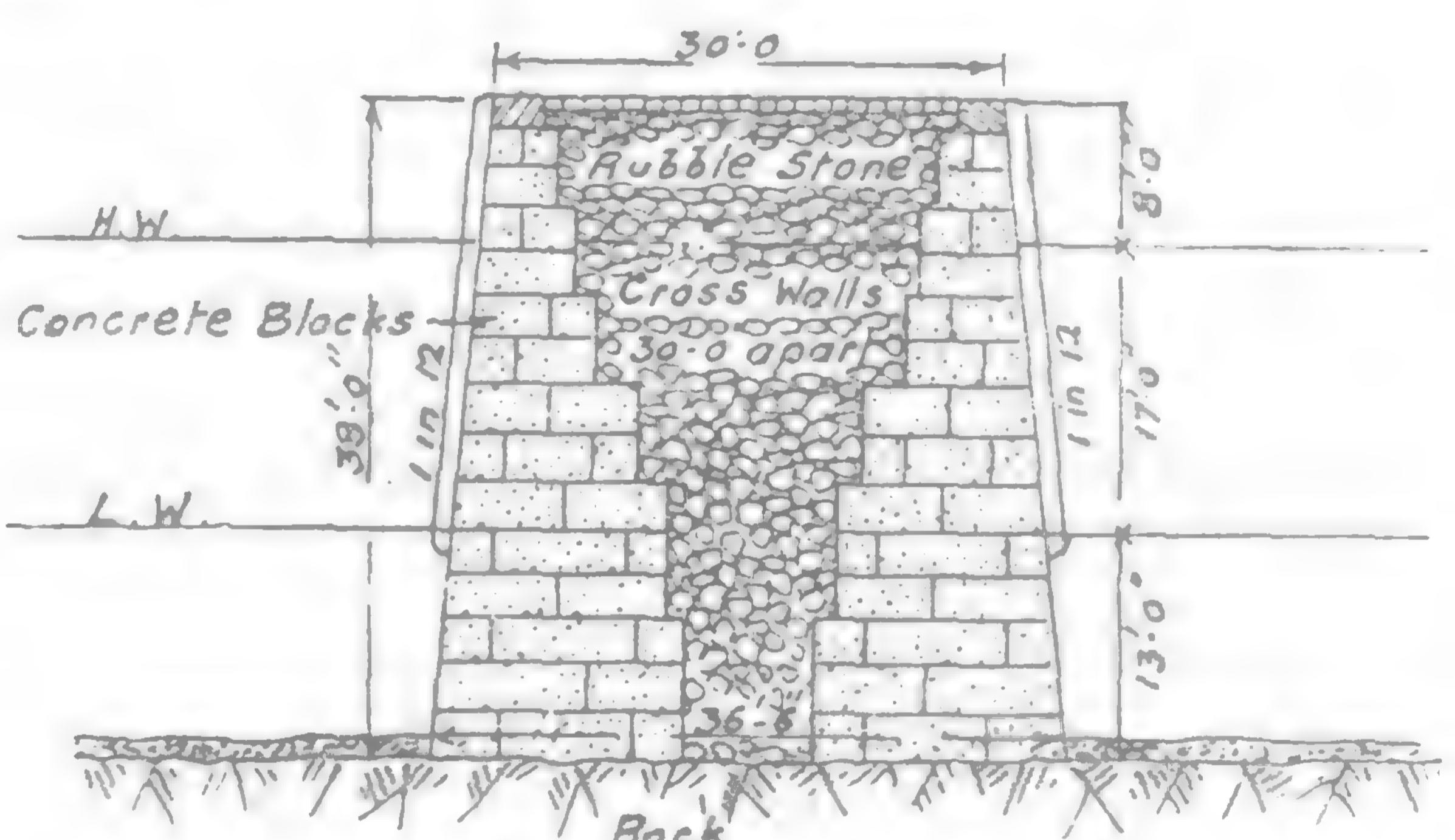
5. Bizerta.



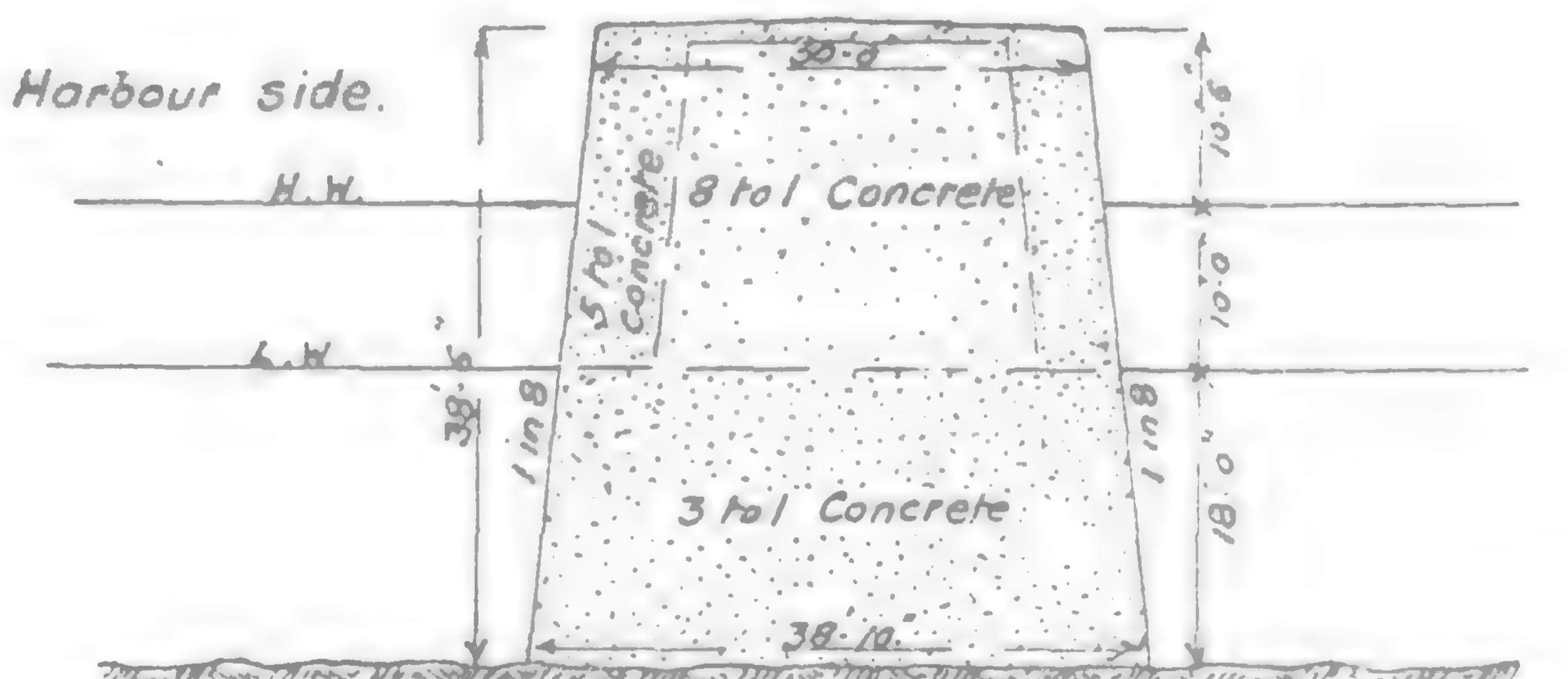
6. Fraserburgh.



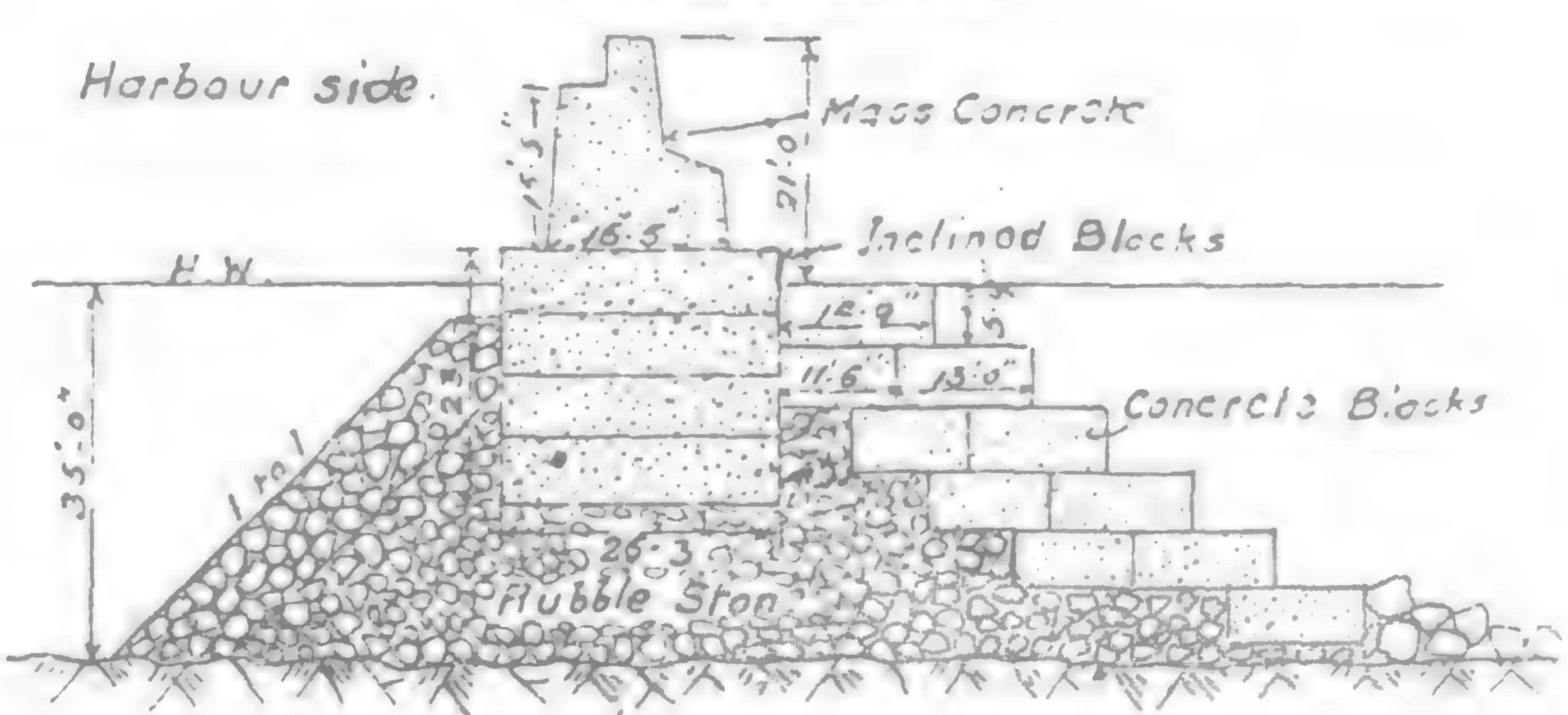
J. Kalk Bay



8. Braye.



9. Buckie.



10. Constanzia.

side above high water, and the outside was covered with blocks of large stones laid pell-mell, sometimes the blocks were made of masonry with either cement or Blue Lias lime, and weighed from 28 to 30 tons each. Masonry blocks are not satisfactory, as they are easily broken by heavy seas.

Breakwaters constructed of timber cribwork filled with stones and then sunk on the line of the breakwater are not uncommon in the United States of America, and in Canada.

At Buffalo South Harbor on Lake Erie (fig. 1), the break-water is of this type of construction and was completed in October, 1900, but in the following November, a heavy gale with a wind velocity of 80 miles per hour, completely destroyed and broke up the six inches thick decking, and the upper portion of the structure, which had to be reconstructed with concrete blocks and mass concrete with rubble stone filling inside as shown in fig. 1a. The waves and spray that broke over the work were estimated to be from 75-ft. to 125-ft. high.

The breakwater at Toronto is also constructed of timber crib-work filled with rubble stone, and surmounted by mass concrete, and as these breakwaters are in practically fresh water, the timber is not attacked by mollusca or crustaceans.

The breakwaters at Bizerta and Algoma consist of reinforced concrete caissons floated out and sunk *in situ* by filling them with rubble stone. At Algoma the caissons are 24-ft. long, and 12-ft. 4-in. deep and rest on piles, the rubble mound having slopes of one to one on each side.

The caissons are partly filled with rubble stone, and the upper portion with mass concrete.

This is a convenient method of construction provided the caissons are entirely filled with concrete, as weight is important in such works, because of the buoyancy of the water, and the walls of the caissons are too thin, without a backing of concrete to withstand heavy wave pressures.

The old piers at the mouth of the river Tyne, also at Dover, Ramsgate, and Braye harbors, consist of masonry walls founded on the rock bed. Breakwaters consisting of mass concrete deposited inside timber shuttering and resting direct on the rock bed have

been constructed in several places. The concrete is lowered in buckets or skips having hinged bottom doors, by a crane mounted on a barge or lighter, or is passed into a rectangular metal tube or tremie reaching from the bottom to the surface, with a hopper at the upper end, and is trimmed and levelled by divers. It is advisable to use a quick setting cement for this purpose.

The outside of the top of the parapet wall of breakwaters is sometimes finished with a bull nosed corbel which is effective in throwing the spray from ordinary breaking waves back over the sea, but in heavy gales there is little advantage gained by this projection.

Mass concrete breakwaters founded direct on rock are the most stable, as they are not waterborne, while mass concrete and blockwork breakwaters founded on rubble mounds are the least stable.

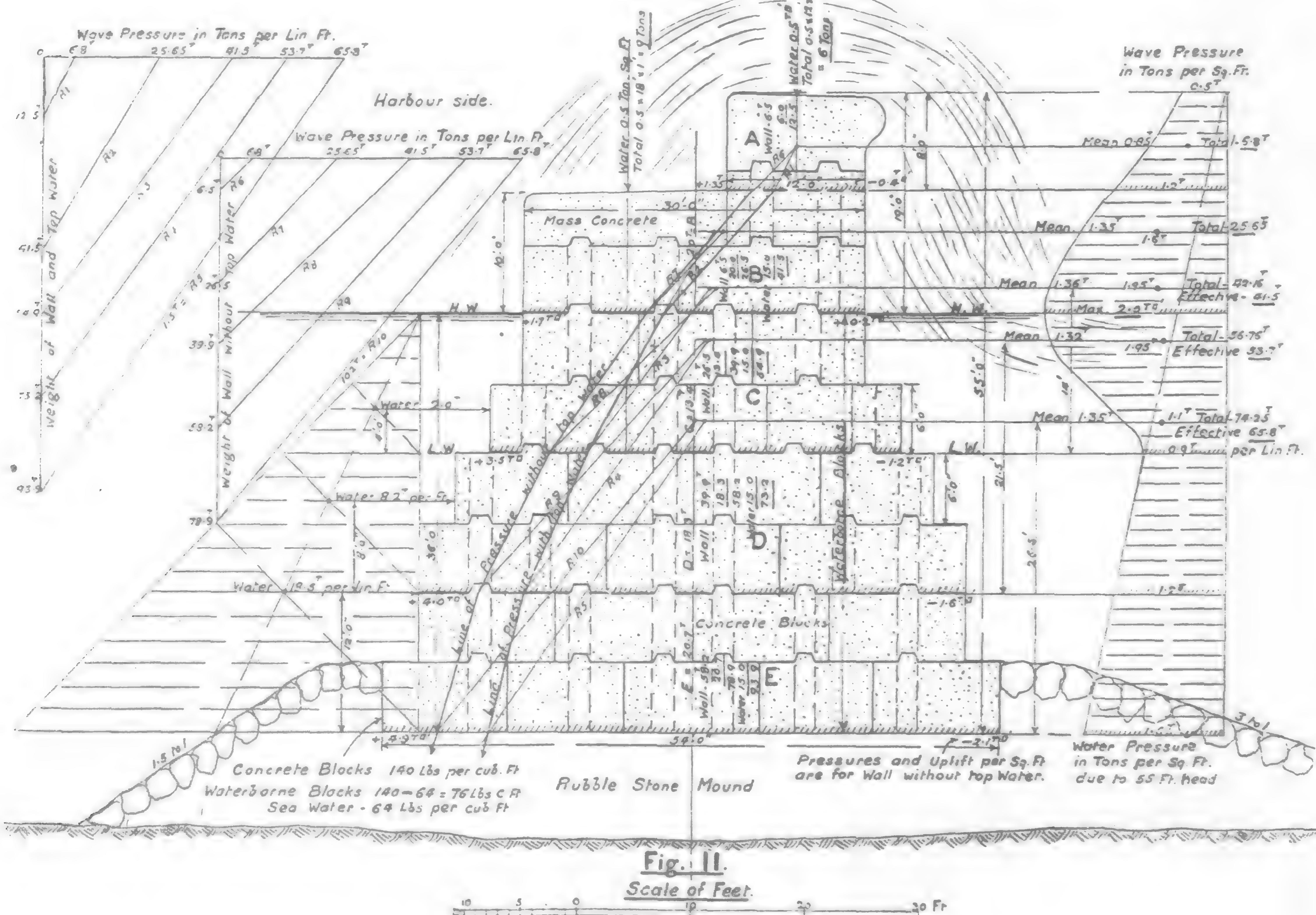
Concrete in Bags

A number of breakwaters that have been founded direct on rock have been constructed of jute or canvas bags filled with concrete. This has been done to avoid the use of shuttering and to ensure that a better quality concrete forms the base, than can be obtained by depositing the concrete direct into the water without any protection, as this is liable to become light and porous due to the cement being washed out.

Experiments have been made on sand and gravel deposited on the sea bed, into which long vertical iron tubes have been driven, and neat quick setting cement grout forced down the tubes by compressed air, but these did not prove satisfactory, as the consolidation of the mass became patchy, the hardening taking place chiefly in the vicinity of the tubes.

The canvas for the bags used weighs from 20 to 22 ozs. per sq. yard, and a double thickness is given to the bottom and sides of the bags, while jute for bags weighs 24 ozs. per sq. yard.

In some cases the bags are large, and equal in length to the full width of the breakwater; when small, they are filled with concrete, sewn up, and lowered by a crane mounted on a pontoon, being set in position by divers, but when large, say 30 to 50-ft.



or more long, the canvas or jute is placed as a lining in an open-top box, about 6-ft. wide and 4-ft. high, into which the concrete is poured direct from a machine mixer; and when full the upper canvas flaps are sewn together, and the box, which has a hinged bottom, is lifted by a crane mounted on a pontoon and lowered into the sea over the site indicated by a diver. When near the bottom the hinged doors are opened, and the bag falls out.

In some cases the bags are filled with concrete and deposited by a hopper barge with hinged bottom doors. Bags of concrete may weigh from 40 to 100 tons, and the concrete is usually in the proportions of one to three, or one to four.

The bags flatten considerably when laid, and there are usually interstices between consecutive bags, but these can be filled with concrete deposited by skips, or by using small bags.

It has been found that small bags filled with dry concrete and deposited in the sea, will set as hard as wet concrete, but large bags of dry concrete set on their surface for a certain depth, and the hearting remains unset.

Concrete Blockwork

Concrete blocks for the construction of breakwaters of the vertical type, and to act as wave breakers, usually weigh from 30 to 50 tons or more, and are made in the proportions of one cement, two sand, and four of gravel or broken stone up to two inch size. They are constructed in timber moulds in a blockyard adjoining the site of the breakwater and are left from six weeks to two months to harden before being lifted and stacked, usually two tiers high, until required for the work.

The blocks are usually about 12-ft. by 6-ft. by 6-ft., and it is advisable to have as few different sizes as possible.

The blockyard is laid out between the rails from 50 to 65-ft. gauge of a travelling "Goliath" crane, or between the trestles carrying a travelling gantry crane. A central set of rails carry a travelling machine mixer for making the concrete. The cement and aggregate are carried on the platform of the mixer, while the water required is tapped at intervals from a pipe laid on the ground. The concrete is deposited direct into the moulds on each side by tipping up the mixer.

The blocks when set are lifted by the "Goliath" crane on to special railway trucks for conveyance to the "Titan" cantilever crane travelling on the breakwater, which is built up the full height from the shore seawards.

For lifting purposes, the blocks have either grooves on each side, and underneath, near each end, so that slings can be placed round them, or else two Lewis bolt holes are made in the top for the same purpose, and Lewis bars with connecting links, resembling a parallel ruler are inserted in the holes, and are attached to the slings of a cross beam hung from the sheaves of the crane; or they may be lifted by cross pivoted claws or lazy longs, engaging with notches in the sides of the blocks, or by means of hammer headed bolts passing through holes in the blocks. "Goliath" cranes have usually a lifting capacity of from 40 to 60 tons. "Titan" cantilever cranes for depositing the blocks in the sea are generally of the revolving type mounted on a turntable, but in some cases they have only a certain sector of action, depending upon the width of the breakwater. The length of the outer arm in the largest cranes from the center of the turntable varies from 110 to 150-ft., and that of the inner arm from 50 to 75-ft., while the total weight of the crane may be so much as 400 tons, and the lifting capacity 50 tons at 100-ft. radius, or 100 tons at 50-ft. These cranes are usually retained as part of the permanent plant for future repair to the breakwater after its completion.

Occasionally very large concrete blocks are required weighing from 200 to 350 tons or more, these are usually constructed on a slipway and are slid into the sea. Slings are placed round the block, and two barges or lighters are brought over the site of the block at low tide, one on each side, the slings are made fast to the barges, and as the tide rises the block is lifted, and is then conveyed to the site of the breakwater and released. In some cases a single lighter is used, with special lifting gear passing through watertight sleeves in the bottom of the lighter.

Several breakwaters have failed because the blocks have not been properly keyed and bonded together, there being a vertical through joint down the center of the structures, with the result that the breakwaters have split into two sections longitudinally.

Most modern breakwaters are now constructed with concrete blocks inclined to the vertical at angles of 15 to 20 degrees, this is done to provide for settlement in the rubble mound, as this may continue for years after the completion of the breakwater. If the settlement is uneven, the blocks slide down, and leave cavities between the top blocks and the mass concrete covering about 6-ft. thick, these cavities can be filled with concrete through large holes drilled in the mass concrete covering.

Blocks should always when possible break joint with one another, and dowels or joggles should be inserted between the blocks, consisting of one to three, or one to four cement concrete in bags about 1-ft. in diam. or square, and two to 3-ft. long, let into grooves in the blocks.

As regards the reduction of the effects of high waves, or range action producing ground swells in the harbor during storms: should the entrance be between piers with a head wind blowing direct into the harbor, there will be little reduction unless the space between the piers widens further in, and to reduce the range effect, pockets or bays should be formed on each side of the shore ends of the piers to act as wave traps, the increased area given will thus reduce the height of the waves, and the ground swell in the harbor.

Harbor Entrances

The widths in feet of the entrances between breakwaters and piers at various Ports are as follows, viz:—Sunderland 700, Dover 650 and 740, Gibraltar 600 and 650, Whitby 170, Tynemouth 1180, Table Bay 250, Port Natal 600, East London 400, Durban 600, Madras 550, Dunkirk 400, Calais 400, Havre 350, Algiers 500, Bilbao 650, Marseilles 820, Tampico 970, Fiume 600 and Adour 550.

To reduce the strength of the currents flowing out of the harbor, which in some harbors amounts to from 2.5 to 3.5 knots, when the tide is falling, or vice versa, the width of the entrance must depend upon the depth of water, and the maximum range of the tide, bearing in mind that the water will heap up more in narrow entrances than in wide ones, that wide entrances are safer for ships to enter during storms, and that the maximum velocity of the water occurs at half tide.

Wave Action

For the open sea the waves are oscillatory and may reach heights of from 30 to 40-ft. during heavy gales, but near the coast waves of translation seldom exceed 12 to 15-ft., although waves from 20 to 30-ft. high, with periods of eight to ten seconds between each wave have been measured at the outer ends of breakwaters during cyclones.

The solid water passing over a breakwater may reach 30-ft. in height above the mean sea level, and the spray up to 100 and 125-ft. The waves of translation near the shores are due to the friction of the ground.

Thomas Stevenson measured with a dynamometer the pressures of waves exerted against breakwaters on the Atlantic and North Sea coasts of Scotland, and found the maximum to range between $1\frac{1}{2}$ and $3\frac{1}{2}$ tons per sq. ft., and Professor Jorge Lira of the University of Chili, has estimated that waves may produce pressures of from 4 to 4.82 tons per sq. ft. during heavy gales (*Le Genie Civil*, vol. 90, 1927), while Professor Luiggi estimates the maximum pressure of 20 to 25-ft. waves at sea level to amount to 2.79 tons sq. ft.

It is probable that these pressures are only quite local, and do not occur over the whole exposed area of the breakwater, in the same way as the maximum pressures exerted by wind against structures are confined to small areas, otherwise few vertical wall breakwaters would stand such heavy pressures, as in most of them the base width is less than the height, but it is advisable that the width of the base should not be less than the total height of the exposed vertical wall. The following formula for the pressure exerted by horizontally moving water against a vertical wall is based on the velocity of wind, where the pressure in lbs. per sq. ft., $P = 0.00322V^2$, when V is the velocity in miles per hour, or $P = 0.00149V^2$, when V = feet per second. The Sp. Gr. of air = $0.001293 = 0.08072$ lbs. per cub. ft., and that of sea water = $1.027 = 64$ lbs. per cub. ft., this is a proportion of one to 795.

Therefore the pressure of moving sea water in lbs. per sq. ft. = $P = (0.00149 \times 795) V^2$ or $P = 1.184 V^2$, where V = ft. per sec. A pressure of three tons per sq. ft. = 6720 lbs. would be

$$\text{equivalent to a velocity of } V = \sqrt{\frac{P}{1.184}} = \sqrt{\frac{6720}{1.184}} = 75.33 \text{ ft. per sec.}$$

sec. or 49.4 miles per hour, but waves striking a breakwater are in the nature of hammer blows, and water falling from a height will

$$\text{have a pressure head in feet } H = \frac{V^2}{2g} = \frac{V^2}{2 \times 32.2} \text{ and a velocity}$$

$$\text{in vacuo } V = \sqrt{H \times 2g} \text{ where } V = \text{feet per second.}$$

The diagram, fig. 11, shows the calculations for the cross section of a typical blockwork breakwater that would be required to safely withstand a uniform wave pressure at high tide level of two tons per sq. ft.

It is 46-ft. high and 54-ft. wide at the base, and stands 10-ft. above H.W. on the harbor side and 19-ft. on the sea side, being founded on a rubble stone mound in 44-ft. of water at H.W.S.T.

The weight of the concrete has been taken at 140 lbs. per cu. ft. (16 cu. ft. per ton) and that of the waterborne portion below H.W. at $140-64=76$ lbs. per cu. ft.

Waves breaking over the structure are estimated to give a pressure of 0.5 ton per sq. ft., which is equivalent to a column of water 17-ft. 6-in. high, or to that of aerated spray about 50-ft. high, although the momentum of falling water will exceed this pressure.

Two conditions have been calculated for, viz.: the weight of the breakwater including top water pressure, opposed to lateral water pressure, and (2) the weight of the breakwater alone against lateral water pressure.

The water pressure is taken at 1.6 tons sq. ft. at the base, due to the 55-ft. head of water caused by the rise of the waves as they strike the wall.

The total weight of the blockwork allowing for the waterborne portion is 78.9 tons per lin. ft. and including 15 tons of top water it is 93.9 tons. The mean wave pressure on the outside amounts to 1.35 tons per sq. ft. \times 55-ft. = 74.25 tons per lin. ft. while the water pressure on the inside up to H.W.S.T. level is 18.5 tons per lin. ft.

The water moments will be as follows for the whole wall, viz.:-

M. of wave pressure = $74.25 \times 26.5\text{-ft.} = 1967.62\text{-ft. tons.}$

M. of H.W. on inside = $18.5 \times 12\text{-ft.} = 222.00$.

A difference of 1745.62 ft. tons in favor of the water pressure.

The height of the mean center of pressure will be—

$$\frac{1967.62 + 222}{74.25 + 18.5} = 22.52\text{-ft. and } \frac{1745.62}{22.52} = 77.5 \text{ tons effective pressure}$$

$$\text{from waves or } \frac{1745.62}{26.5} = 65.8 \text{ tons effective pressure at 26.5-ft.}$$

It is immaterial which figures are taken, as the resultants will fall through the same point, so the latter method has been adopted for the calculation of each section of the wall.

The overturning moments for the worst condition, that is without top water pressure will be:—

M. of breakwater = $78.9 \times 27\text{-ft.} = 2130.3\text{-ft. tons.}$

M. of wave pressure = $65.8 \times 26.5\text{-ft.} = 1743.7\text{-ft. tons,}$ giving a factor of safety of 1.22, against overturning, and the line of pressure falls 5-ft. inside the inner toe, with a pressure of 4.9 tons per sq. ft. and an uplift of—2.1 tons per sq. ft. at the outer toe, this will be sufficient to cause the outer joints of the blockwork to open, and produce a breathing effect on the breakwater, which invariably takes place during heavy gales.

The impact of waves on blockwork breakwaters also compresses the air in the back joints and when the waves recede, the imprisoned air expands, and under considerable pressure forces out the blocks on the face to the extent of several feet in some cases, when the blocks are not well keyed or dowelled together. Suction also plays an important part in the destruction of breakwaters, as it does in the denudation of beaches.

When concrete superstructures are constructed on rubble stone mounds, the tops of the mounds should be kept at least 15-ft. below low water level, so that the stones may be less disturbed by wave action or the ground swell, which in heavy gales seldom extends to more than 25 to 30-ft. below the water level.

Waves are most dangerous at the beginning of the ebb after high water, when the tide runs out against the seas, and causes the waves to mount higher.

Wave breakers formed of concrete blocks laid pell mell have interstices between them amounting to from 20 to 33 per cent, and are reduced in weight by their buoyancy, their actual weight in sea water being about 0.542 of their weight in air, thus a 30 ton block will only weigh 16.26 tons in the water, and is liable to be displaced by heavy seas if near the water level, while rough granite blocks weigh 0.623 of their actual weight when immersed.

New "Caterpillar"

At a factory preview in Peoria, Illinois, Caterpillar Tractor Co. executives have just seen two sleek, new, completely self-contained Diesel electric sets of 15 and 20 kilowatt capacities.

Bulletins, dispatched to the company's dealer organization throughout the world, are telling of these two low cost units, that can be set up and running in less than an hour after delivery. So simple is the job of installation that the only wire connections to be made are from the generator terminal to the circuit breaker, and from the circuit breaker to the distribution box. The light weight sets need no special bases, but can be set down anywhere and put to work.

All electrical equipment required by the sets is inbuilt, with the exception of a circuit breaker, according to company engineers. No rheostats, switchboards, instruments or complications of any sort are needed. Because sets of this capacity are almost always operated close to the power destination, even a voltage regulator is unnecessary.

Eliminating the need for such auxiliary equipment makes these units less expensive than comparable Diesel electric sets available to-day. Prices are brought down to about the same as those for gasoline generators of the same capacity, "Caterpillar" sales managers were told.

Uses for these power packages are almost unlimited. They can operate air conditioning machinery; serve as standby power for airports; run storage refrigeration machinery; provide power for lights for trailer, auto, construction and logging camps; power carnivals and circuses; floodlight swimming pools and athletic

Diesel Electric Sets

fields or be used as power for country clubs. Grain elevators of smaller sizes can use them without changing their electrical hookup; as can large farms, plantations and dude ranches. Gasoline retailers will install them to power pumps and other A.C. equipment: hospitals, hotels, bridges, pumping and power plants, can use them as auxiliary power.

Considering this wide application, Caterpillar Tractor Co. has simplified maintenance problems by having the entire units serviced by the world wide "Caterpillar" distributor organization. Moreover the units are designed to be operated by personnel without special training.

The engines have but three operating adjustments, none of which involves the Diesel fuel system. The generators are of single unit construction, equipped with ball bearings, which require lubrication only once in six months. Built-in regulation enables the sets to pick up relatively large motor loads with little light flicker and voltage drop.

The two sizes available, as announced, are the 34-15 and the 44-20. The former set is supplied in three-phase, 110, 220, or 440-volts at 15 kw., .8 power factor. It is also available as single phase, 110/220-volts, three wire type; and 110 and 220-volt two wire type at 13 kw., .8 power factor.

The 44-20 set is supplied in three-phase, 110, 220, or 440-volts, at 20 kw., .8 power factor. It is also available single phase, 110/220-volts, three wire type; and 110 and 220-volts, two wire type at 18.5 kw., .8 power factor.

Base Metal Production in the Philippines

By RIZAL F. GATICA

ONE of the most significant developments in Philippine mining industry during the past four years is the rise of base metal production to a position of outstanding importance in Philippine economy. Increasing commercial uses of four base metals produced in the Islands, such as iron, chromite, copper and manganese, and the significance of their position as essential war materials have attracted world-wide interest in the present development work that is being undertaken to bring these metals to the markets of world powers which are in need of war materials to push through their national defense programs.

The rise of base metal production in the Islands during recent years, although still far below that of gold, has furnished basis for observers to predict that in the near future the output may reach a proportion which may be compared with the remarkable position attained by gold. Indeed, present figures on exports of base metals have become a convincing factor to support this view.

Five years ago, exports of base metals were insignificant items in Philippine foreign trade figures and did not even attract the attention of investors or foreign observers of Philippine political and economic problems. To-day, shipments occupy an important position in the present economic set-up of the Islands, iron ore alone jumping to eighth place on the list of principal exports replacing cordage and copra cake and meal from their former positions. The rapid progress of base metal mining should have an important bearing on the present progress of the armament race among the nations of the world.

Although shipments of base metals during the first half of 1939 showed a slight drop from the figures for the same period in 1938, the decline is considered only temporary as mining companies producing base metals are in a position to meet the demand abroad. Exports this year amounted to a value of P.3,899,865 as compared with P.4,268,964 last year, according to statistics obtained from the Philippine bureau of customs. These figures show a drop of 8.9 per cent. Copper from gold bullion, which is not a direct product of base metal mining, is not included in these figures, otherwise the decline would be only less than one-half of one per cent. The drop in exports this year was caused by a combination of factors which did not at all reflect any recession in progress of base metal mining.

Shipments of chrome ore and manganese showed considerable drop this year, which however was somewhat offset by the big gain in exports of iron ore. The market for chrome ore in the United States broke down during the last few months of 1938, a condition which continued this year, and chrome mines had to suspend shipments. Japan, which has absorbed all manganese produced in the Islands, has reportedly placed restrictions on Japanese importers as a result of the present Sino-Japanese conflict in order to meet the needs of her army and navy to push through their campaign in China. Manganese, although considered a war material, is more needed in the steel industry of Japan, and manganese producers have been hard hit by the restriction imposed by the Japanese government. On the other hand, iron ore, which Japan needs very much as a war material, has not been included in the restriction and all ore produced in the Islands has been consumed by Japan.

Among base metal exports, iron ore continued to maintain its leading position with total shipments for the first six months of 1939 being valued at P.2,443,038 as compared with P.1,830,115 for the corresponding period in 1938. Although exports of chrome ore dropped to slightly more than 50 per cent, this metal is still second on the list with exports being valued at P.659,105 as against P.1,393,120 last year. United States continued to be the leading market for chrome ore with Japan, Canada and a few European countries buying small though encouraging quantity.

Copper ore exports were valued at P.437,665 this year as compared with P.441,966 last year. Japan has been the market for copper since 1936, with United States absorbing all copper from gold bullion as gold is sold in that country. Manganese dropped to fourth place this year with total shipments valued at P.338,686, while for the first half of 1938 exports were valued at P.603,763. Philippine shipments of lead ore are still an unimportant item, exports being valued only at P.21,371 this year, and no exports made last year. United States also is the market for lead. The only company producing lead suspended operations in September, 1938, due to prevailing low prices for this metal, and what ore is produced to-day comes from small desultory mining.

The following table gives the value of Philippine exports

of base metals during the first half of 1939 as compared with that of the same period of 1938:

	1938	1939
Iron ore	P.1,830,115	P.2,443,038
Chrome ore	1,393,120	659,105
Copper ore	441,966	437,665
Manganese ore	603,763	338,686
Lead ore	—	21,371
<hr/>		<hr/>
Copper from gold bullion	P.4,268,964	P.3,899,865
	100,559	459,080
<hr/>		<hr/>
Total	P.4,369,523	P.4,358,945

Shipments of base metals during the past four years is shown in the table given below. The figures reveal the increasing exports of these metals as well as the rapid progress of base metal mining in line with the progress attained by the gold mining industry of the Philippines.

	1935	1936	1937	1938
Iron ore .. P.1,143,929	P.2,868,427	P.2,652,078	P.4,080,645	
Chrome ore .. 27,558	307,518	1,542,100	1,576,845	
Copper ore .. 126,167	1,704	656,451	1,534,194	
Manganese ore .. 13,213	6,920	337,716	999,185	
<hr/>		<hr/>	<hr/>	<hr/>
Total .. P.1,310,867	P.3,183,669	P.5,282,734	P.8,240,844	

It is believed that shipments of chrome ore will increase in the near future as soon as the market in the United States is back to normal. Market conditions will surely improve with the announced plan of the United States government to store essential war materials, including chromium, and with the reported discovery of a new process of treating lower grade chromite ore



Loading iron ore on a Japanese ship from the pier of the Philippine Iron Mines, Inc., in Larap Peninsula, Camarines Norte



Shoveling dirt with Bucyrus-Erie equipment on the property of the Philippine Iron Mines, Inc., in Larap Peninsula and Calambayanga, Camarines Norte, preparatory to mining the ore. The claims of the company reportedly contain more than 5,000,000 tons of high grade iron ore. The company is a Filipino Corporation controlled by American capital and management. All ore produced from the property is sold to Japan

for commercial purposes. The increasing needs of the rapidly growing electro-metalurgical industry and of the alloy steel industry should increase the demand for chrome ore. The present feverish armament race among the powers of the world is another factor which should create additional markets for Philippine chromium, not only in the United States and Japan, but also in European countries.

These factors have created an unusual interest in the Philippines as a country with vast mineral deposits essential for war materials. Inquiries on these deposits have been received by various mining companies from interested buyers in Germany, Italy, Japan, Canada, Great Britain, France, Belgium, United States and other countries throughout the world.

The Philippines has the distinction of having the largest deposits of chromite in the world. These are located in Masinloc, Zambales province, on the western slope of Luzon island, and are owned by Consolidated Mines, Inc., but operated by Benguet Consolidated Mining Company, second biggest gold mine in the Islands. Other companies own chromite claims in Zambales and have been known to have made shipments of ore to the United States, Europe and Japan. The deposits in Masinloc are reported to contain more than ten million tons of ore, and have radically altered the world picture of chromite deposits as 50,000 tons were formerly considered a big deposit. The Islands enjoy distinct

advantages over other chromite producing countries as chromite deposits here are located within a few miles from the sea shore which make mining costs lower. Recognizing the importance of these deposits, Lavino and Company and Union Carbide Corporation, of New York, have offered to control the operation and development of the chromite property of Consolidated Mines, Inc., but so far nothing definite has been announced by these corporations.

Judge John W. Haussermann, an American old timer in the Philippines, and President of Benguet Consolidated Mining Company, which operates the Masinloc chromite deposits, has on several occasions urged the United States to acquire reserves of chrome ore in the Philippines as he believes that the Islands would ultimately be the world source of supply of chrome.

Other chromite deposits are also known to exist in other parts of the Philippines, such as in Camarines Sur, Pangasinan, Ilocos Norte in Luzon; and in Antique in the Visayas. The Florannie Mining Company owns a group of chromite claims in Camarines Sur and has shipped ore to the United States through Benguet Consolidated, which operates the property.

Japan, which has absorbed all manganese ore produced here, will undoubtedly continue to take all Philippine production in the future and resumption of purchases in greater quantities is

expected unless there is a change in the neutrality policy of the United States government with regards to the Sino-Japanese conflict as any change in the present policy will affect exportation of war materials from the Philippines which is a possession of the United States. The interest of the Japanese in Philippine base metals is shown in the fact that at least four mining companies have been established in Manila, either as branches of mining corporations in Japan or as separate entities wholly managed by Japanese nationals residing here. These companies at present either operate or own iron, manganese and copper deposits located in various parts of the Islands, and are no doubt a factor in the development of its mineral wealth.

Manganese deposits are known to occur in the provinces of Ilocos Norte, Pangasinan, Nueva Ecija, Abra, Tarlac, Nueva Vizcaya, Camarines Sur and Albay in Luzon island; in Coron island, near Palawan; Tawitawi in Sulu, Capiz, Siquijor island in the Visayas, and Masbate. There are several companies engaged in the exploitation of these deposits, ore produced being shipped to Japan which is the only market at present for this metal.

The largest iron ore producer in the Philippines to-day is the Philippine Iron Mines, Inc., located in Larap Peninsula and Calambayanga, Camarines Norte. This company has done extensive development work on its deposits, producing a monthly average of over P.250,000 worth of ore. Other companies which are



Shoveling dirt by hand on the property of the Philippine Iron Mines, Inc., preparatory to mining the ore. Piles of ore may be seen on side



A section of the iron claims of the Philippine Iron Mines, Inc., in Larap Peninsula and Calambayanga, Camarines Norte. The coconut trees yield nuts and the earth yields iron ore. Note ore beneath trees

developing iron deposits are the Samar Iron Mining Company in Samar, Visayas group; Gold Star Mining Company in Marinduque province, south of Luzon, and Agusan Gold Mines, Inc., in Paracale, Camarines Norte, a province in Luzon also known as a gold district. The property of Agusan Gold Mines is operated by Insular Mines Operators, Inc., a Japanese managed Filipino corporation.

The largest iron deposits are known to exist in Surigao province in Mindanao, which reportedly contained from 400,000,000 to 500,000,000 tons of ore. The Philippine government has reserved these vast iron deposits for its own use in the future. Recently, the government reportedly contacted Japanese buyers for joint management and development work but due to possible repercussions in the United States since Congress which might legislate adversely against the Islands, the plan was dropped. The deposits in Surigao, however, are of low grade and need special smelting process before the ore can be made available for commercial purposes.

The Surigao deposits were discovered by an American engineer formerly employed by the Philippine bureau of public works in 1912. The ore is "principally ferruginous clay, but contains also an abundance of small round pellets of hydrous iron oxides, as well as fragments or crusts of the parent rocks, much altered, porous, and iron-stained, but maintaining their original form. Mineralogically the ore is probably a series of hydrous iron oxides related to limonite. The surface of the deposit is a deep reddish brown, almost crimson at places, but beneath the surface the color is lighter—yellowish brown—while the transition stage between the ore and the underlying rock is pale green. The thickness of the mantle of ore varies irregularly up to a maximum of about 20 meters. The ore in places is soft and very spongy or mealy. In walking over it one often breaks through the crust into small openings or cavities beneath the surface. The deposits have a similarity to the Nipe Bay iron deposits of Cuba.

The Camarines Norte deposits which are now under development by the Philippine Iron Mines were worked by a Japanese company in 1918, but operations were suspended in 1919 after the cessation of the war boom. Nothing was done on the property until the present operators took them over in 1934. The ore is nearly pure hematite, with subordinate intermixture of gangue matter. The hematite is partly hard and crystalline, partly soft and rather friable. Quartz is the commonest and most uniformly distributed gangue matter: it seems to fill the interstices between the hematite individuals, and it forms druses lining small vugs and veinlets in the ore mass. The ore has an iron content of 60 per cent or more. Surigao ore containing less than 60 per cent of iron.

The other well-known iron deposits are located in Bulacan province in Luzon, but in view of the distance of the deposits to the sea shore, no large scale development work has been done. Ore from Bulacan contains more than 60 per cent iron. However, small operators continue to smelt the ore in crude blast furnaces for plow shares and points in clay molds, which are used by native farmers in plowing their fields. Bulacan iron ores are essentially hematite and magnetite, and occur as intimate mixtures in all proportions from pure magnetite to pure hematite, although hematite is more commonly encountered. The ores are usually fine-grained and massive, but the hematite is sometimes "micaceous." The hematite ores are hard and dense, while the magnetite and the typical hematite-magnetite ores are softer. Quartz is prominent in most of the ore. Great boulders and blocks of iron-stained quartz mark the immediate neighborhood of the ore bodies. The walls of the shallow pits from which the iron ore is mined are in many instances a soft dark-green rock, which is in some degree analogous to the "skarn" or complex silicates, which are characteristic of some of the Scandinavian iron ores.

No large scale development work has been done on copper deposits in the Philippines due to its low grade content and due to oversupply of copper coming from Chile, in South America, and from the Congo district in Africa, until the year 1935. Copper deposits are found in Mankayan, Mountain Province, Pangasinan and Batangas in Luzon; in Masbate and Marinduque islands, and on the small island of Rapu-Rapu, near Albay in southeastern Luzon. Development on commercial scale is now being undertaken by Lepanto Consolidated Mining Company, which has a mill of 500 tons a day turning out concentrates, in Mankayan, Mountain Province, and by Hixbar Gold Mining Company, in Rapu-Rapu island. Small quantity of ore is also produced by a few scattered



A tunnel on the manganese claims of the Negros Mining Co., in Milagros, Masbate Province. Ore may be seen on the left hand side of the picture. Negros mining is a new producer of manganese ore, shipments having been made to America and to Japan

mines in other copper-bearing districts of the country. Copper produced from gold bullion from gold mines is sent to the United States for smelting to separate the copper from gold, while mines producing purely copper ore or concentrates send their products to Japan.

Lead and zinc in the form of sulphides occur in the provinces of Marinduque, Masbate, Camarines Norte, Cebu, Mountain Province, and Batangas. Only the Marinduque deposits have been developed on a large scale, a mill being erected by Mineral Resources, Inc., in 1937. This company produced over P.270,000 worth of lead and zinc until the time it was forced to stop operations in September, 1938, due to low prices obtained for these metals. The property was formerly developed by the Marinduque Mining Company from 1916 to 1920, when the company abandoned it.

Interest of the world has been centered during recent years in Philippine mineral deposits as mining and trade journals throughout the world have commented on this vast available source of supply of war materials. The development of these mineral deposits have added new sources of wealth to the Philippines, but at the same time they have raised a question mark as to the ultimate political future of the Islands. Rich mineral deposits possessed by a small country, like the Philippines, will undoubtedly play no small part in the shaping of the political future, not only of the Islands, but perhaps of the whole Far East.

The Shanghai Directory

Numerous changes that have taken place in recent months in Shanghai are reflected in the recent issue of The Shanghai Directory for 1939, which is published by Messrs. *North-China Daily News & Herald, Ltd.* This familiar red colored volume, which in the past has often been imitated but never equalled, continues to hold place as the most valuable work of reference for business and professional people that is produced in Shanghai.

The contents of the Directory include a half dozen or more sections that afford specific information. The first section gives a list of foreign and all major Chinese business firms, diplomatic and consular staffs, foreign military forces, colleges, schools, clubs and associations in the two municipalities, besides listing missionary bodies. A special section is devoted to an Agents' Directory listing trade agencies of foreign and Chinese firms. Other sections include a classified trade directory, an alphabetical list of Mercantile Marine Officers employed on Coastal and riverine vessels, a business Who's Who, a Street Directory and a Residential Directory.

As usual the volume is thumb indexed for quick and ready reference and throughout the typographical is of highest standard, being uniform and ensuring the utmost legibility. The price of the book is \$8.00.

Aerial Ropeways

By A. H. WRIGHT, A.M.I.Mech.E.

(Proceedings of The Engineering Association of Malaya)

PART II

ONE arrangement to effect this was to connect one of the carriage running wheels by means of bevel and other gearing to the bucket thereby uprigting it—, this introduced undesirable complications and in the case of the slightest obstruction or stiffness, caused the running wheel to skid on the track rope.

A second design employed a sprocket wheel which, engaging a rack fitted at any suitable point in the nearest station or terminal caused the bucket to be uprigted.

A much more simple device which has proved to be reasonably reliable in practice, consists of a specially shaped tail piece attached to the underside of the bucket itself which, by engaging with a spiral formed cam or ramp, returned the bucket to its vertical position, a catch, formed integrally with the tipping lever, dropping into a slotted plate on the hanger thus securing the bucket in this position.

The car running wheels are, for loads up to 0.75 ton, arranged in pairs and should be not less than 8-in. in tread diameter made of specially tough cast steel with machined treads carried either on plain, ball, or roller bearings —, in this connection it is good practice where plain bearings are used and the plant has to operate in localities not well supplied with skilled labor, to use phosphor bronze pins and not to bush the wheel —, it is easier and simpler to fit a pin than a bush.

In order to limit wheel loading where heavy individual loads are carried, articulated groups of four running wheels are employed and as the gross load increases so do the tread diameters of the running wheels up to as high a figure as 18-in.

Having briefly outlined the general arrangement of the Monocable and Bicable systems, and before entering into the questions involved in the preference for, or the special application of, the one or the other, it will be of interest to mention two specialized types of Ropeway.

The Jig-Back or To and Fro System

This type of Ropeway as its name suggests, is intermittent in action and may be based upon the Monocable or Bicable systems, the former for light loads and the latter for really heavy individual loads up to and over 24 tons.

It is operated with two carriers or carriages which travel in opposite directions and are permanently fixed to the traction rope —, as these carriages do not pass round the terminal sheaves the action is intermittent, the direction of motion of each carrier being reversed after each cycle of operation.

In passing it should be mentioned that practically all passenger Ropeways, of which there are a large number in Europe, are built

on the Bicable Jig-Back system and it is here that the individual loads rise to the high value quoted. Passenger cars to carry up to 50 persons having been constructed and placed in service.

The Fixed Clip Monocable

This Ropeway development is particularly suitable for light capacities such as plantation work where produce, as tea, etc., are to be carried and for the transport of valuable ores and ore concentrates where the quantities to be handled are small but valuable.

The carriers are attached permanently to the rope, which is reeved on the Monocable system, by steel straps in such a manner that they are free to pass over trestle sheaves and round terminal driving and tension sheaves.

Car motion is continuous, loading being performed by hand or via movable hoppers suspended from the terminal structure, unloading being usually done by hand-tipping the load receptacles as they pass through the return terminal.

Ropeway Prime Movers and Auxiliary Equipment

There are a number of factors which, with any given installation, have to be taken into consideration when making a choice as to the type of prime mover to employ, among these are the ease of access to the site of erection, the class of labor and degree of supervision which the plant in question is likely to receive, as well as economic considerations regarding fuel supply, etc.

Apart from these general considerations there is the question of the particular nature of the loading to which the

primemover is to be subject, an important point in this connection being the relation of the starting to the full load running torque.

The torque required to maintain a Ropeway in motion under normal conditions of loading is very nearly constant for given conditions of weather and temperature but, when starting-up under European or similar winter conditions, a torque considerably in excess of normal is required to overcome the higher lubricant viscosity engendered by the low temperatures, while in severe weather "ice-welding" may occur between the rope and line sheaves of the Monocable or the car running wheels and track rope of the Bicable. Such conditions give rise to starting torques of from 100/300 per cent above normal where such weather conditions are likely to be experienced. These high starting torques may be mitigated by the judicious choice of bearing and lubricant and the maintenance of a really efficient film of lubricant on the ropes themselves though, even this relatively simple expedient is difficult to follow in certain extreme cases as with one plant operating across the Andes between such a difference in altitude that lubricant

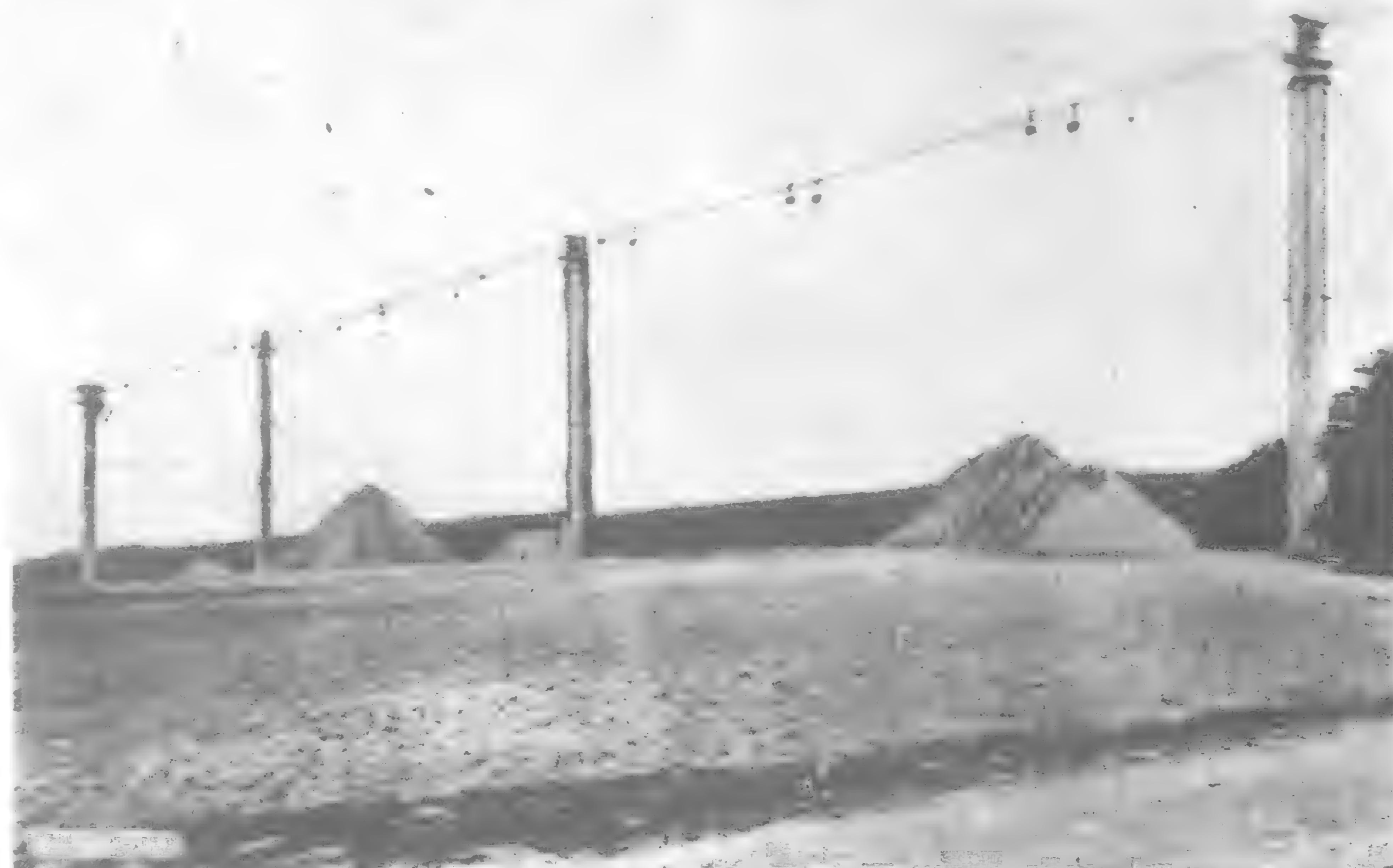


Fig. 20. An automatic dumping bicable 7,000-ft. long handling chemical plant waste at 150 tons hour (Bleichert)

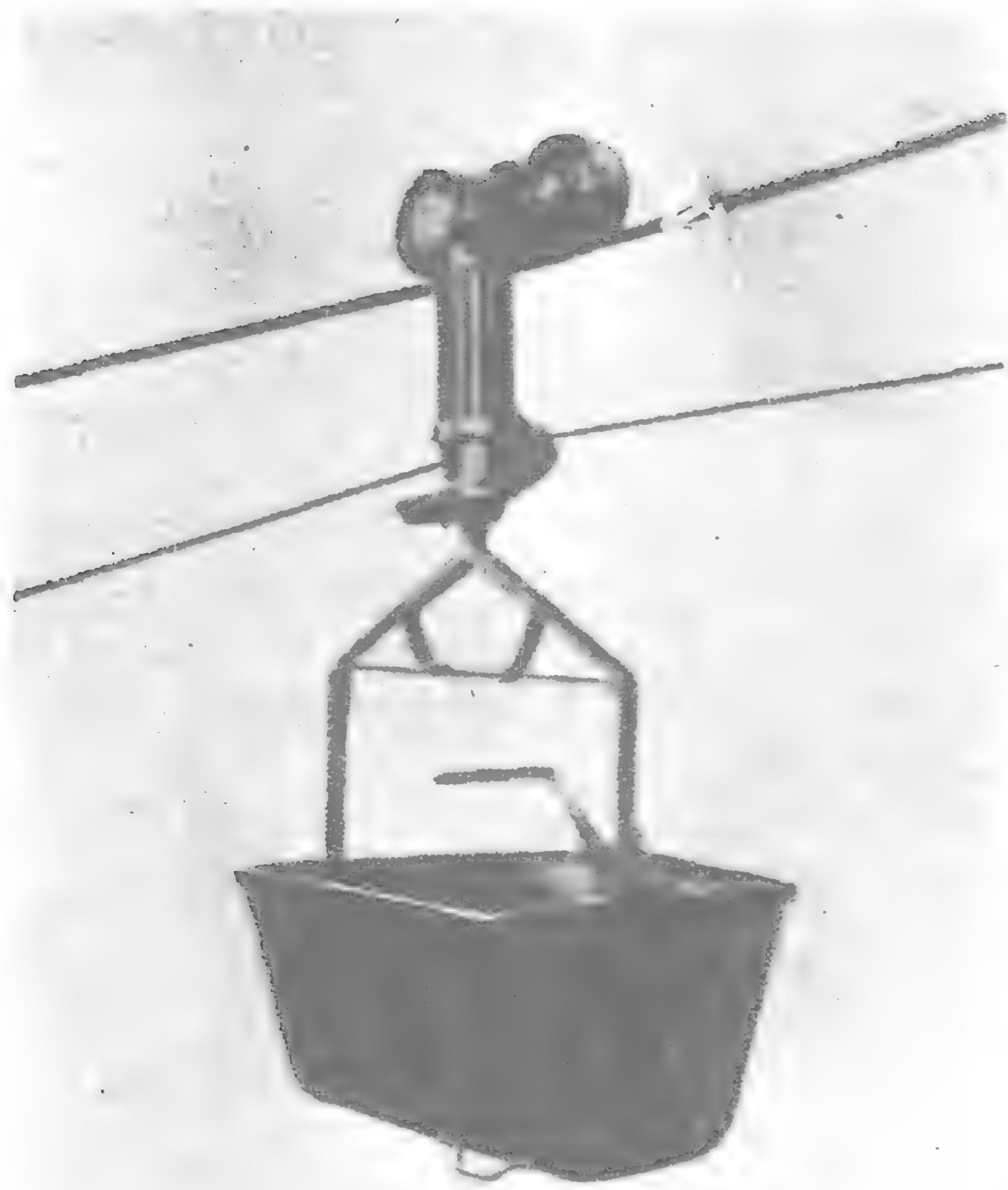


Fig. 21.—A two-wheel under-type coupler bicable auto-tipping skip car.

particular type of primemover may, other things being equal, be ruled out of consideration but with the longer heavy duty plant certain machines have advantages over others for this service.

In England and other countries similarly placed for electricity supply, an electric motor is undoubtedly to be preferred for practically all lines provided, of course, that the cost per unit is reasonable and the plant is a constant speed installation. The only important precaution necessary is to ensure that the starting switchgear is so designed as to make a sudden or jerky start impossible and that it also provides for half speed operation over fairly long intervals.

With long Ropeways overseas electric drive, though preferable in many ways, has certain disadvantages especially if a long power transmission line has to be built between the source of supply and the site of the driving station.

It is, in the author's opinion, that for such plant a steam drive possesses distinct advantages over the electrical layout and also, to a certain extent, over internal combustion units for, a steam engine of quite ordinary design even if badly maintained as is so frequently the case with plant under the control of non-technical staff overseas, is capable of dealing with very heavy starting efforts as a function of its normal operation and continuing to give reasonable service over long periods.

Further, where long transmission lines are involved it will generally be found that the steam or internal combustion installation is the cheaper in first cost. It being very inadvisable to utilize the ropeway trestles for the carrying of H.T. transmission lines due to vibration giving rise to serious insulator failures.

The use of steam is of course dependent primarily on a supply of fuel at an economic price and as so often is the case this question is the deciding factor in favor of the internal combustion engine.

In his connection the various types of Diesel or heavy oil engine immediately suggest themselves and, provided an efficient friction clutch is used in the transmission, this type of engine finds considerable favor especially for overseas plant. Possibly the two stroke Diesel has the advantage over the four stroke type due to its simplicity and, with slow

of sufficiently low viscosity to serve the purpose at the higher levels tends to run out of bearings and from the rope at the lower levels of the line.

Owing to conditions occasionally arising during normal operations which call for frequent starts and stops as well as "inching," the primemover or its transmission equipment must be such as to provide for this contingency.

With relatively short and light lines these particular conditions do not, however, amount to such values that any

speed engines, its lower cyclic variation, case having arisen with small single cylinder four stroke unit, where the engine cyclic variation was such to set up harmonic oscillation in the rope which tended to increase to undesirable amplitudes.

In common with railways and similar transport systems a Ropeway has to be equipped with signal and telephone apparatus the type and elaboration of which being naturally dictated by the length of the line, its layout and the service to be given.

With short automatic dumping lines where the material is discharged into hoppers or bins signal bells only are necessary while with the longer lines a more elaborate system is called for embodying telephones in each of the terminal stations and in those *en route*.

This signal gear is usually designed on the simple single line earth return system with local batteries and weather proof ironclad instruments of robust construction the single line being carried from insulators fixed to the Ropeway trestles.

Telephones likewise should be of the ironclad, weather proof, loud speaking type, magneto operated and with extension bells. The lines being carried from the Ropeway trestles with earth return.

It is important to ensure that good electrical connection is made between the earth return, the carrying and traction ropes and the trestles of the Ropeway so that by means of a portable telephone, signals may be transmitted by linesmen on duty at any point on the line.

Ropeway Design

In a paper of this kind it is not necessary to enter fully into the whole of the technical details of Aerial Ropeway design many of the calculations involved being of a normal mechanical drawing office nature, hence it is proposed to indicate briefly the general procedure only.

The capacity and nature of the material to be handled having made possible a preliminary choice of rope speed and the type, number, and net capacity of the Ropeway cars, the approximate setting out of the trestles, on an accurately surveyed and plotted profile of the route to be followed, is done on the basis of the generally accepted formulæ for rope sag viz :—

$$L^2 W$$

$$D = \frac{L^2 W}{8T}$$

where :—

D	=	Rope sag or dip.
W	=	Weight of the rope per unit length.
L	=	Span between trestles.
T	=	Tension in the rope.

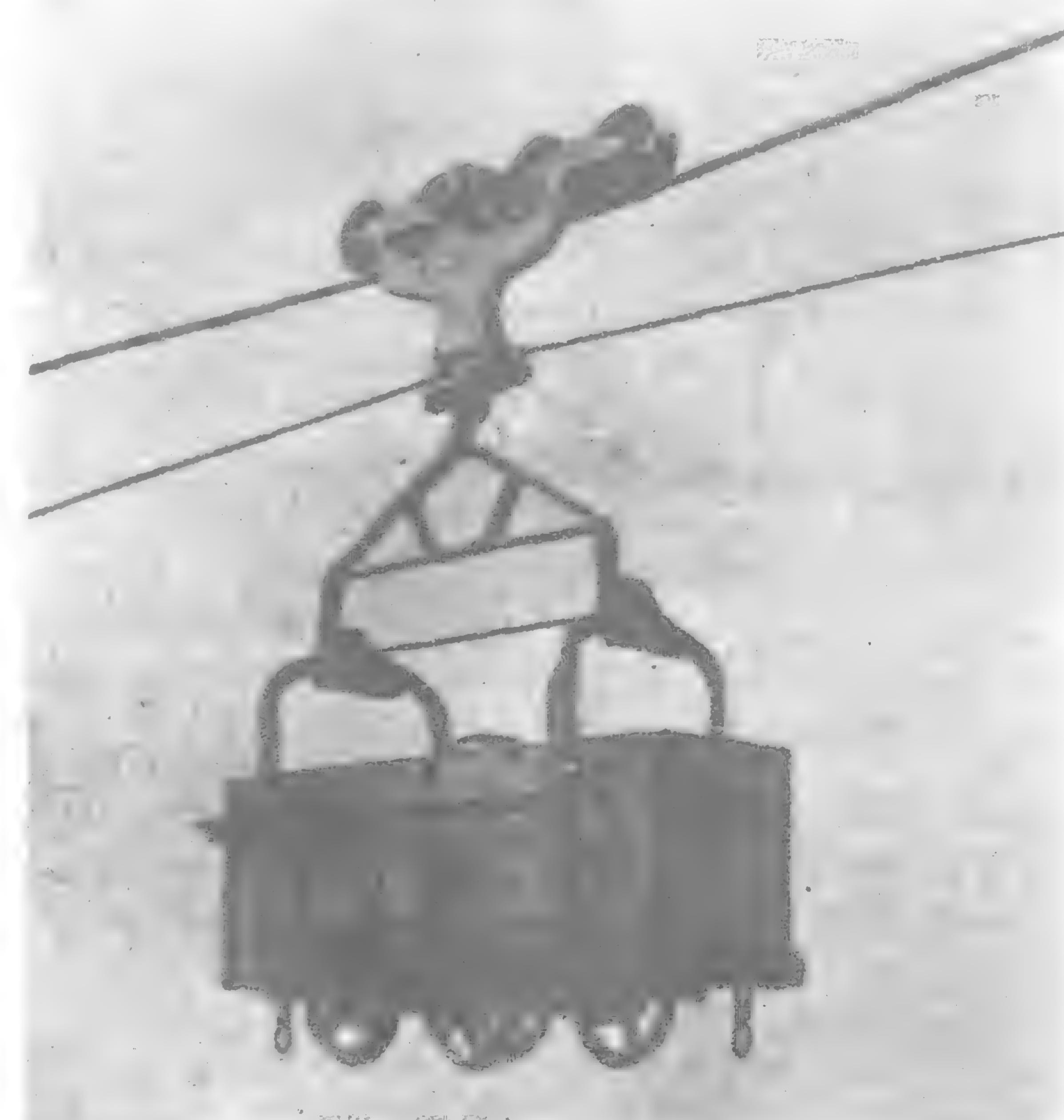


Fig. 23.—A 4-wheeled under-type coupler for the direct transport of pit or quarry tubs. Load 1½ tons

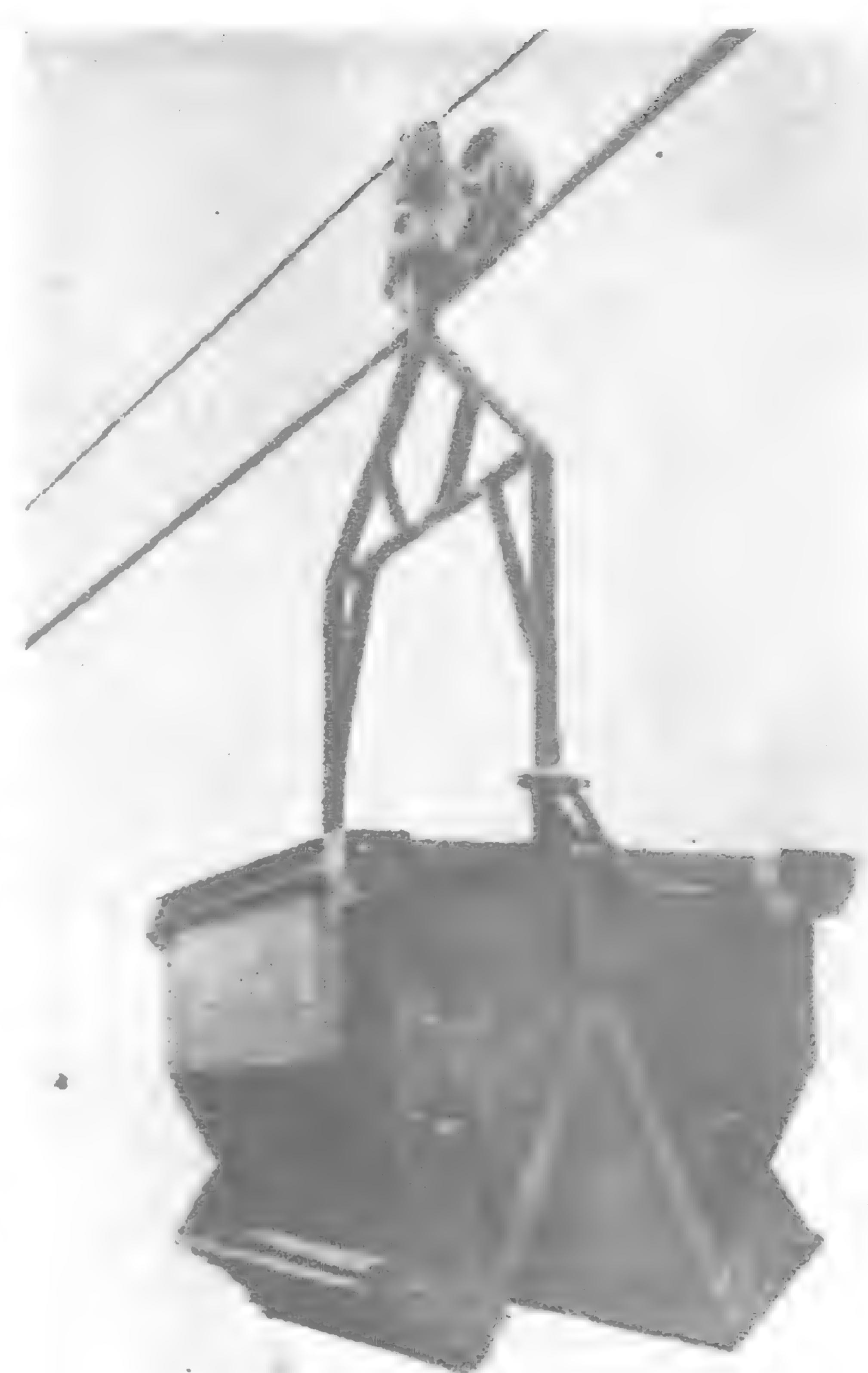


Fig. 22.—Auto bottom discharge car. A two-wheel over-type coupler bicable

The heights of the trestles are further corrected for possible minute errors in surveying or plotting which may lead to "rope float" by introducing a factor between 1.7 and 1.1 in the denominator according to whether the rope chosen is of spiral or full locked construction.

It will be seen that to arrive at the above distribution and heights of the trestles it is necessary to make some preliminary calculation of the tension in the rope.

The form taken by a suspended cable such as the track rope of a Bicable Ropeway which is loaded in such a manner that the weight per unit length is uniform, is that of a catenary curve, while, if the loading is such that the weight per unit chord is uniform, the form taken is that of a parabola. The definition of a catenary assumes a perfectly flexible suspended member such as a chain but, since the locked construction rope usually employed offers a considerable resistance to bending the nearest approximation to the curve actually made by the rope is more likely to approach that of the parabola than a catenary.

Further the equations for a catenary curve are complicated and rather cumbersome while those for a parabola are relatively simple hence, it is common practice in Ropeway work to use the parabolic equations—, the degree of accuracy in so doing being illustrated by the following example which assumes in each case a distributed load of say three tons on a span of 300 feet with a deflection in the center of 1/35 of the span or 8.57 feet, the difference between the results of the catenary and parabolic formulæ being of the order of 0.25 per cent only.

In calculating the tensile loading of Bicable ropes due to the rope itself it is assumed that the maximum load in the rope is at the center of the span and to add to this the loading due to the individual car loads likely to be on the particular span at any one time.

Expressing the distance between these superimposed loads as a function of the span, the following simple and easily manipulated formulæ are obtained where :—

w = weight of rope in lbs/ft.

W = weight of one of the concentrated loads in tons.

L = span in feet.

D = rope dip or sag in feet.

Tensile load due to weight of rope only

Tensile load in rope due to one concentrated load in center of Span

As for (2) above but with two concentrated loads = $\frac{WL}{3D}$ (3)

As for (3) above but with three concentrated loads = $\frac{WL}{2D}$ (4)

Making the general assumption that, $D = L$

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then these formulæ are further simplified as follows :—

$$(1) \dots 4wL \dots (5)$$

$$(2) \dots 8W \dots (6)$$

$$(3) \dots 10.6W \dots (7)$$

$$(4) \dots 16W \dots (8)$$

Hence the total tensile load in a suspended rope having three superimposed concentrated loads W , spaced at $L/4$, is given by :—



Fig. 24.—View of the line of the Zugspitz passenger ropeway, Bavarian Alps (Bleichert)

$$= \frac{wL^2}{8D} \quad (1)$$

$$= \frac{WL}{4D} \quad (2)$$



Fig. 25.—A bicable carrying 100 tons/hour showing an elevated deflection station and the arrangement of protection nets (Bleichert)

$$\frac{wL^2}{8D} = \frac{WL}{2D}$$

$$\text{and if } D = \frac{1}{32} \text{ then}$$

$$T = 4(wL + 4W)$$

On the basis of the above formulæ it is possible to determine the diameter of rope required using the general factor of safety of four to five but in Bicable work account must be taken of the load imposed on the track rope by the traction rope which, when held by the car couplers, is virtually supported by the track rope.

On the strength of their experience, however, some designers of Bicables prefer to employ an empirical formulæ based upon stresses due to bending owing to most breakages having taken place at the so called point of "arrested vibration."

A formulæ of this nature for capacities up to 50 tons per hour which is often employed is as follows :—

$$W_1 = \frac{C}{100} (W + SW_2)$$

where W_1 = Weight per meter track rope.

W = Weight of car and load in kilos.

S = Distance between cars in meters.

W_2 = Weight per meter traction rope.

C = Constant which for spiral ropes = 0.85 and for locked construction ropes = 1.05.

For each additional five tons per hour above 50 tons per hour 0.05 is added to the constant C .

The curves in fig. 23 serve to show the generally accepted relation between car load, traction rope, and track rope diameters, using special half locked construction for the latter and two wheeled cars.

As distinct from the monocable the rope of which is, of necessity, the same size throughout, the Bicable track ropes are of different sizes for the loaded and empty sides the latter being from 25-40 per cent smaller in diameter than the former.

It will be obvious that there is a maximum length of track rope which can be economically tensioned, with the result that on long lines intermediate track rope tension stations are necessary.

The economic distance between an anchorage and a tension station is proportional to the rope size, and the number of cars on the particular section at one time.

Continental practice is to relate the distance between cars on the line to the section length, the generally accepted figures for two wheeled cars and loads up to one ton gross per car, being as follows :—

Distance Between Cars on Line	Distance Between Anchorage and Tension Gear
50 Meters	1,500 Meters
80 "	1,800 "
100 "	2,050 "
150 "	2,400 "
200 "	2,700 "
250 "	2,900 "

Traction Ropes

The calculations involved in determining the size of traction ropes are relatively simple, it being only necessary to add the initial tension imposed on the rope to keep it from excessive sag and to provide sufficient adhesion between the rope and the driving sheave, to

the tensile load set up due to raising the cars and their loads through the difference in level between the loading and discharge terminals or visa versa. the effort necessary to raise the rope itself through this difference in level, the frictional effort to move the cars and rope along the track, together with the frictional effort to turn the trestle line sheaves which support the traction rope when it is not held by a passing car. As the traction rope is supported for at least one half of its length by the car couplers it is only necessary to take into consideration the sheaves on one side of the line.

Employing the usual factor of safety of from 6 to 8 to this total tensile load the size of rope of given construction can be determined. Ropes of steel wires having a breaking load of from 75 to 100 tons per sq. inch are usually employed.

It should be noted that if the difference in level between the terminals is in favor of the loads the factors for the frictional loads due to the cars and trestle sheaves assume a negative sign.

In connection with the question of difference of level between terminals this factor has to be taken into consideration when determining the actual weight required to give the initial tension in both track and traction ropes.

As has been pointed out, it is preferable to install the tension gear in the lower of the two terminals for in this case the cumulative tension in the rope due to its own weight may be subtracted from the calculated weight required—, with the tension gear in the higher terminal the reverse is the case and the calculated weight has to be increased to compensate for the rope weight reaction.

Ropeway Cars

The mechanical design of the cars follows normal engineering practice and hardly calls for comment here. The size of skip or

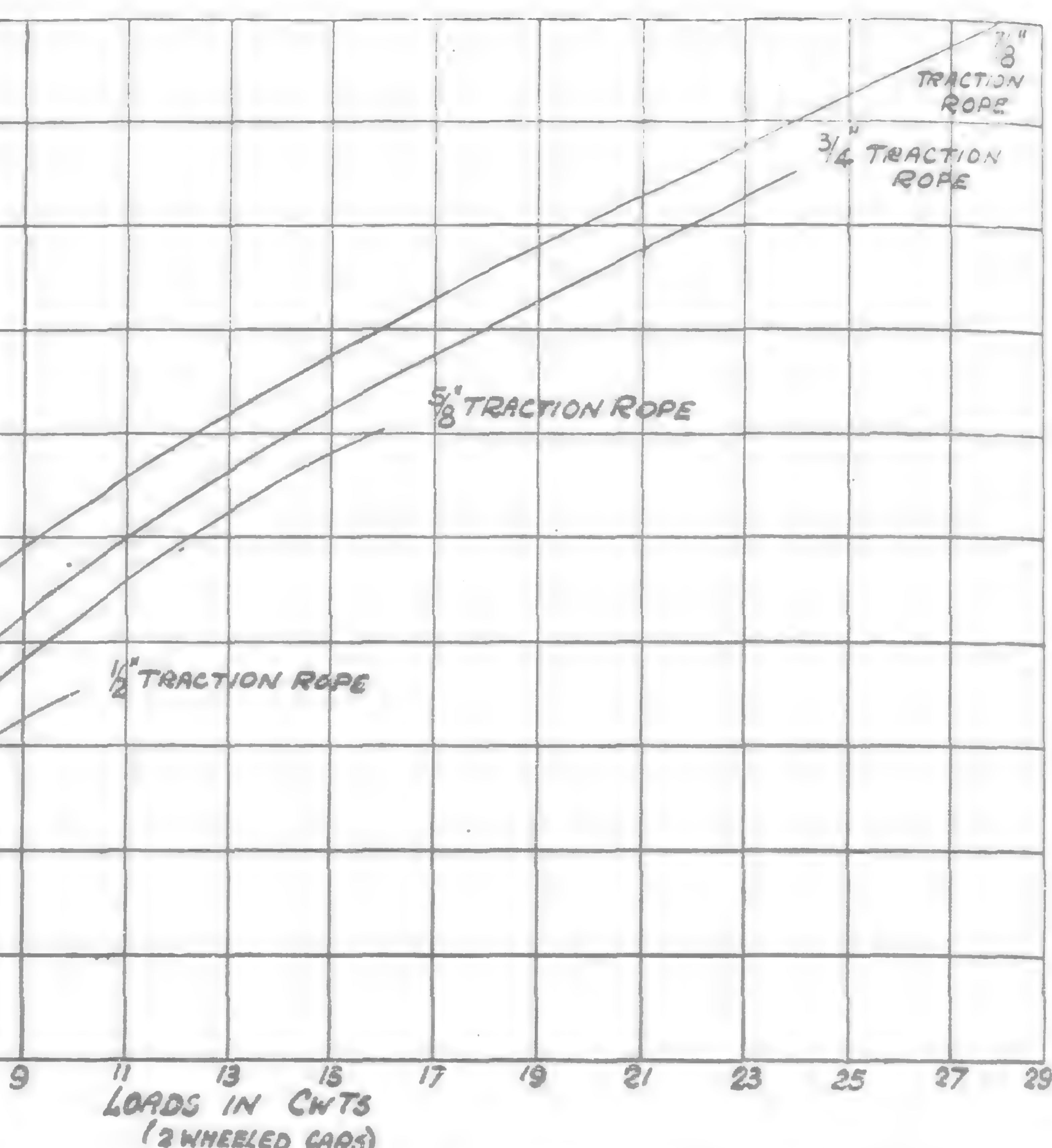


Fig. 26.—Curves showing the relation between track and traction rope dia's and car loads

bucket varies with the material to be handled between the limits of 38 to 380 c.ft. The following capacities being those generally accepted for certain materials:—

Ores	..	..	..	70	—	80 c.ft.
Stone	..	..	..	90	—	120 ..
Coal	..	..	..	150	—	200

The decision to use two or four wheeled cars is mainly bound up in the first cost of the plant—, the designer being pressed to produce as cheap a job as possible, adheres to the two wheeled type even though the four wheeled car enables him, for a given capacity, to reduce his track rope diameter by approximately 15-25 per cent. This reduction in track rope diameter and, in consequence, the cheaper rope it is permissible to employ, does not always account for the extra cost of four wheeled cars but there is no doubt that in the long run the operation of a four wheeled car plant would lead to a saving in rope maintenance costs greater than the initial extra expenditure necessary.

Power Required

Due to the fact that the actual frictional losses in a ropeway have been found by experience, to vary between very wide limits under different climatic conditions, etc., the final determination of the power required to drive any given line is largely a matter based upon the individual maker's previous experience.

It is however possible to arrive at a guiding figure by adding the four main frictional factors, namely:—

- (1) The total rolling friction of both empty and full cars on the line.
- (2) The frictional effort required to move the rope on both sides of the line.
- (3) The frictional effort required to rotate all the line sheaves.
- (4) The power required to overcome terminal gear friction.

If then the theoretical power either required or developed by the raising or lowering the net load carried through the difference in level between



Fig. 27.—A bicable carrying 50 tons of coke per hour from coke ovens to blast furnaces (Bleichert)

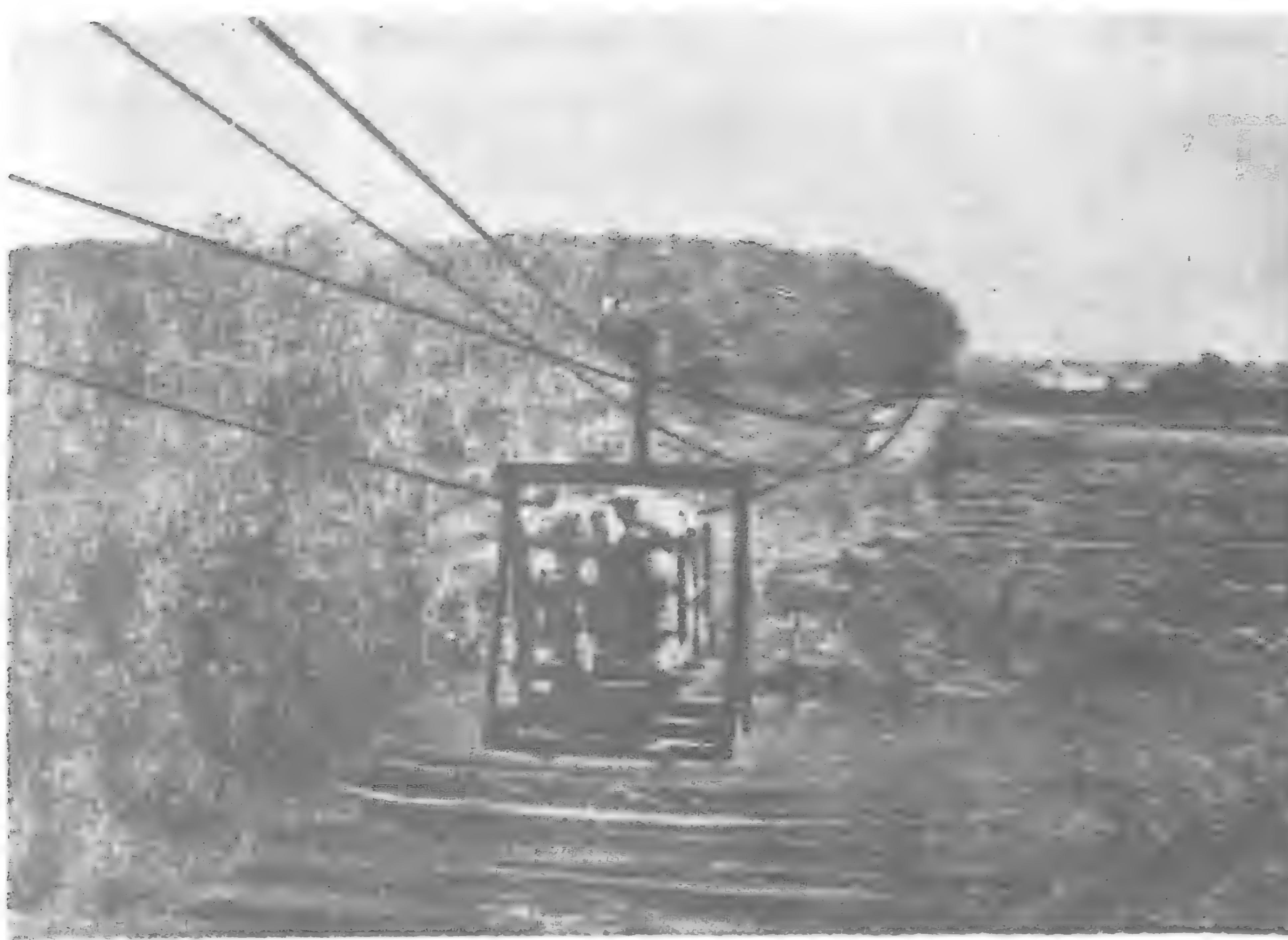


Fig. 28.—A 72 ton/hour jig-back carrying sugar cane cars across a 1,000-ft. swamp, Panggoongredjo, Java (Bleichert)

the terminals is added or subtracted from the sum of the four factors enumerated above a figure for the net power required is obtained.

In cases where there is a large difference in level between the terminals in favor of the load it often occurs that power is actually developed in which case a suitable air dynamometer brake is usually fitted to absorb smoothly such excess power or, in certain special cases this power is utilized to raise water or do other useful work: great care must however be exercised in this connection that there is no liability of allowing a runaway while a large and really efficient brake must be installed to bring the plant to rest.

The speeds at which Ropeways are designed to operate vary widely, consideration having to be given to the contour, type of line, the service to be given, and the initial cost.

The higher speeds such as 450/500 feet per minute are seldom used on lines other than perfectly straight utilizing return or turn-back sheaves of 14/16 feet and over in diameter.

When angle stations have to be negotiated a maximum of 400 feet per minute is generally employed, 350/360 feet per minute being more general as being less liable to give rise to trouble due to rope hammer.

While it is possible to run Bicable plant at higher speeds than those given above especially if the line is straight, it must be remembered that at the loading stations the cars have to be brought by hand up to the rope speed at the moment of coupling unless undesirable jerking and surging is to take place, the practice of allowing slipping to take place between the Monocable rope or the Bicable traction rope and the saddles or couplers giving rise to very heavy rope and coupler jaw wear.

In the special cases of plant required to automatically dump from the open track rope speeds are kept as low as consistent with reasonable first cost—, the general limits of speeds in these circumstances being from 250/350 feet per minute.

Comparison and Limitations of the Two Ropeway Systems

A question which frequently gives rise to considerable controversy is the choice of Ropeway system to employ for a given installation, the exponents and manufacturers of the one or other being loath to give way especially when tendering in a competitive market.

The modern development of the Monocable has made the choice even more difficult for while capacities of 80/100 tons per hour used to be a strong argument in favor of the Bicable, Monocables working up to 180 tons per hour have now been installed and worked efficiently.

The Monocable has however certain disadvantages as compared with the Bicable the chief of which is the present inability to operate return terminals and angle stations automatically hence where the cost of labor is high the Bicable is the cheaper to run owing to the fewer operators required.

In general however the Monocable may be considered suitable for capacities up to 100 tons per hour on lines having maximum gradients of 1 in 2.5, a steeper rope angle leading to difficulty with the saddles or clips.

The natural transition from the Monocable system to the Bicable occurs when the rope size and in consequence the weight of the rope together with the number and gross weight of the cars necessary to comply with the hourly capacity required entail such heavy driving and tension gear that it is cheaper to fix the main rope employing it to support the cars only as suspended tracks and to use the lighter traction rope for hauling.

The Monocable Jig-Back Ropeway is cheap in first cost and is suitable for capacities from 5/10 tons per hour, the individual loads being between the limits of 5/20 cwt. according to the length of the line.

The Bicable Jig-Back as employed for passenger service has been built to deal with loads up to and over 24 tons and to carry over 150 passengers per hour in each direction.

This application of the Aerial Ropeway is however highly specialized and has led to special systems being developed such as the Bleichert-Zuegg system on which the majority of such plant are now built.

The Fixed Clip Monocable is only suitable for capacities of 5/8 tons per hour with individual loads of 5/7 cwt.

The following table gives general particulars of the present day capabilities of the systems discussed and while serving to show what has been done with Aerial Ropeways as a means of transport over country where it is frequently impossible to put down roads or railways due either to technical difficulties or to prohibitive



Fig. 29.—A bicable carrying simultaneously 27 tons limestone, 18 tons cement and six tons coal per hour at Padang, N.E.I. Portland Cement Maatschappij—40,000-ft. long (Bleichert)

first cost, the figures given cannot be taken as representing finality.

		Bicable	Monocable	Fixed Clip Monocable	Jig Back Passenger Bicable
Length, Miles .. ..	..	21.5	47	0.5	2.5
Capacity, Tons/Hour .. ..	..	300	180	8	—
Pay Load, Tons .. ..	..	4.25	1.5	0.25	50 persons
Ton Mile Capacity/Hour .. ..	..	1,500	—	—	—
Gradient .. ..	..	1 in 1.12	1 in 2.25	—	1 in 1.35
Free Span,—Miles .. ..	..	1.25	0.5*	—	5,000 feet
Height above Sea Level, Feet ..	15,000	—	—	—	9,250
Difference in Level between Terminals, Feet .. ..	..	11,500	—	—	5,201
Passengers per car .. ..	..	—	—	—	50
Passengers per hour .. ..	..	—	—	—	150 in each direction

*Unconfirmed

In England and similar European countries the transport of goods over long distances by Ropeway is the exception rather than the rule for the reason that other means of transport, i.e., railways, roads and canals have reached a very high state of development.

Overseas in countries which for reasons of size and population have not yet reached this stage of development the Ropeway presents a means of transport practically independent of the character of the ground over which it has to pass—, by this is meant that hills, mountains, rivers and valleys, etc., have quite a relatively small bearing on the cost of its construction and efficiency as compared with the laying down of surface roads and railways.

Naturally the erection of a Ropeway in very difficult country is a relatively costly matter as compared with the erection of a similar plant in Europe over plain or undulating country but even so this extra cost cannot compare with the enormous cost of railways even if of relatively light construction.

In conclusion the Author wishes to acknowledge the kindness of Messrs. Ropeways Ltd., of London, Messrs. Adolf Bleichert & Co., of Leipzig, for having provided the slides shown and to Messrs. C & E (Patents) Ltd., of London, for data given.

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"A Window to the World"

(Continued from page 376)

organization of cotton arbitrage with a Cotton Exchange, the opening of which will undoubtedly contribute to the increase of cotton re-exports to neighboring countries.

Gdynia has also an arbitrage for skins, hides and leathers, fruits, etc., apart from now being an important center for herring and sea-fish trade, which business is aided by the construction of special chilling sheds, cold stores and depots.

The manufacture of goods from imported raw materials in Gdynia, has also permitted the rise of numerous undertakings, such as coffee roasting mills, tea blending and packing sheds, fruit drying plants, banana ripening sheds, pharmaceutical preparation work, vegetable canning, fish flour production, etc. Another kind of industry, closely connected with the life of the port is the new shipyard, which last year started new life. Thanks to the investment of large sums of money, the necessary machinery has been bought and "Gdynia Shipyard" will now be in a position to build large ocean going vessels.

How much of the total Polish trade turnover is Gdynia handling? In what degree is Gdynia necessary to Poland? The totals are: 80 per cent in volume and 65 per cent in value of the whole Polish foreign trade. Those two figures need no comments.

The general expansion in Poland's foreign trade and the transit trade to countries lying on her borders such as Czechoslovakia, Roumania, Hungary and Yugoslavia, are the main factors of the policy for the future.—J. J. P.

New Bus Lines

The Manchoukuo Directorate of Railways has announced the opening of two new bus lines for passengers and freight. Two return trips will be made daily on each line. One is the Chupu route from Hiachiutai to Puhai, a distance of 34 kilometers and the other an extension of the Tetai line, from Taifangshen to Chalu, 22 kilometers.

Minerals in Manchuria

According to the reports on the Manchurian natural resources investigation now being made by the members of the Japan-Manchoukuo Joint Investigation Party the natural resources in Manchoukuo are very rich and both the Manchoukuo and Japanese government authorities are highly satisfied with the results of the survey.

For instance, the coal deposits at mines investigated this time are estimated at 11,000-million tons. Since there are many other coal mines untapped, the total coal deposits in Manchoukuo will be much larger.

Besides coal, Manchoukuo is rich in deposits of light metal ore and non-ferrous ore. As both Japan and Manchoukuo are in need of these mineral products, their production will be increased either by enlarging the present production equipment or commencing the operation of the hitherto unexploited mines.

Among the mines surveyed were the Malukou Mine, Tsingpaitse Mine, Yangchiachangtse Mine, Tienpaoshan Mine, and Taping Mine. Of these mines, the Malukou Mine is rich in gold, silver, lead, and molybdenum, while the Yangchiachangtse Mine produces zinc and lead. The Tsingpaitse Mine produces lead and silver, the Tienpaoshan Mine, copper, zinc, and silver, and the Taping Mine, gold and silver.

Wang Ching-wei Answers Some Questions

(Continued from page 366)

anti-Communist movement and will be able with their militia to maintain local peace and order.

With regard to foreign policy, the Manifesto of the Sixth National Congress has clearly pointed out that China will co-operate with Japan in maintaining the peace in East Asia, while at the same time will co-operate with other foreign Powers in furthering the cause of world peace. China will accord due respect and protection to legitimate foreign rights and interests in China. Such a policy is not only part of China's diplomacy, but is a corollary of China's policy of promoting international economic co-operation.

The question of recognition of the National Government by the foreign Powers, will, in my view, hardly arise. For our Government is actually and legitimately the National Government purged of its Communist and Communist-dominated elements who will be replaced by peace-loving and anti-Communist elements. Therefore, whatever changes brought about will be confined to personnel and policy; the legal Status of the Government, internally and internationally, will remain substantially unchanged. And even if some of the foreign Powers should propose the non-recognition of the National Government, the matter is of minor importance.

For it may be recalled that when we brought about the downfall of the Manchu Dynasty in 1911, it took two years for the Republican Government to be internationally recognized. The National Government was established in 1925 in Canton, but it was not until 1927, after the conclusion of Northern Expedition which brought the downfall of the Peiyang militarists, that the formal recognition was accorded. By way of contrast, formal recognition by the Powers did not save the Spanish Republican Government from extinction after flight of the republican leaders to France.

In short, our aim is to save China from national extinction: our success should not affect the interests of the foreign Powers. Neither will China's co-operation with Japan to safeguard East Asia be detrimental to foreign interests. And it is hoped that the foreign Governments and public leaders will give sympathetic understanding to our true aims and co-operate with us for the common welfare.

Crossley Engined Motor Tank Barges

IN October, 1936, the Medway Oil and Storage Co., Ltd., London, equipped a twin-screw tug—M.T. *Temeritie* with two Crossley 4-cylinder direct reversing Scavenge-pump Diesel Marine engines, each developing 100 b.h.p. at their normal speed of 450 r.p.m. In September, 1938, a further vessel of the same fleet—M.T. *Fidelitie* was re-engined with a Crossley three-cylinder direct reversing Scavenge-pump Diesel Marine engine of 75 b.h.p. at 450 r.p.m. In connection with the two engines on the M.T. *Temeritie*, it is interesting to note that they have given satisfactory service during two years and three months—(approximately 6,000 running hours)—with an average maximum wear per cylinder of 0.010-in., representing only 0.0016-in. per thousand hours' running.

Both vessels were constructed by Messrs. R. Dunstan, Ltd., Thorne, and after the satisfactory results given by the engines in both these vessels under most arduous working conditions, the owners decided to place reliance in Crossley engines when considering machinery for two new vessels M.B. *Mobilitie* and M.B. *Tenacitie*.

The principal dimensions of these two barges are:—

Overall length ..	..	61-ft.	6-in.
Moulded beam ..	..	15 "	6 "
Moulded depth ..	..	7 "	6 "
Draught ..	..	6 "	6 "
Carrying capacity ..	..	93 tons approx.	

For vessels of these dimensions the carrying capacity is large, an advantage made possible only by an exceedingly compact layout.

As will be seen from the general arrangement plan, accommodation for the crew is provided at the fore-end where a saloon is fitted with port and starboard berths.

The main portion of the hull is taken up by three tanks, which are used for carrying petroleum in bulk, each tank being fitted with separate four-inch suction pipes leading to a six-inch common main on the deck.

The machinery space is right aft, with wheel-house immediately above.

The vessels work the Yorkshire rivers and canals, between the Humber and Knottingley, so that it has been necessary for them to be constructed in accordance with the requirements of the Aire and Calder Navigation by-laws governing vessels of this class.

In addition to the duty of self-propelled tank barges, each is fitted with a tow hook, and a substantial part of the service is that of towing dumb tank barges.

Obviously, for such compact little vessels the machinery must occupy the minimum of space, whilst the exceedingly bluff lines call for a propeller working at slow speed. These

peculiar requirements, together with 100 per cent reliability and exceptional economy, are provided by the "BWMB.4" type four-cylinder Crossley Vertical four-stroke engine which drives the propeller through reversing and two-to-one reduction gearing. The engine develops 50 b.h.p. when operating at the normal speed of 900 r.p.m.

Before giving a detailed description of the engine itself, it may be added that both engines are controlled from the wheel house by a simple remote control system, in which duplicates of the engine lever controls are operated by Teleflex cable protected from damage in stout tubing. This is a simple and foolproof system of remote control and is subject neither to the necessity for adjustment nor to leakage, which takes place with remote control systems employing hydraulically operated mechanisms.

It is very unusual for an engine of this size to be fitted with exhaust heaters for the hot water system aboard. Such small boilers are, however, fitted in the case of the M.B.'s *Tenacitie* and *Mobilitie*, which may be taken as examples of the very latest practice in small motor tank barge design.

In order to ensure that the engine water jackets are maintained at the most advantageous temperature, the flow of water through the engine jackets is controlled by a thermostat, which by-passes the water and maintains the water jackets at an even temperature without the necessity for constant adjustment of a regulating valve.

Regarding the machinery layout, it is interesting to note that the engine is started by means of compressed air stored in a small bottle of one half-cubic foot capacity this being sufficient to give the main engine at least six starts without re-charging when once filled to the normal starting pressure of 600 pounds per square inch.

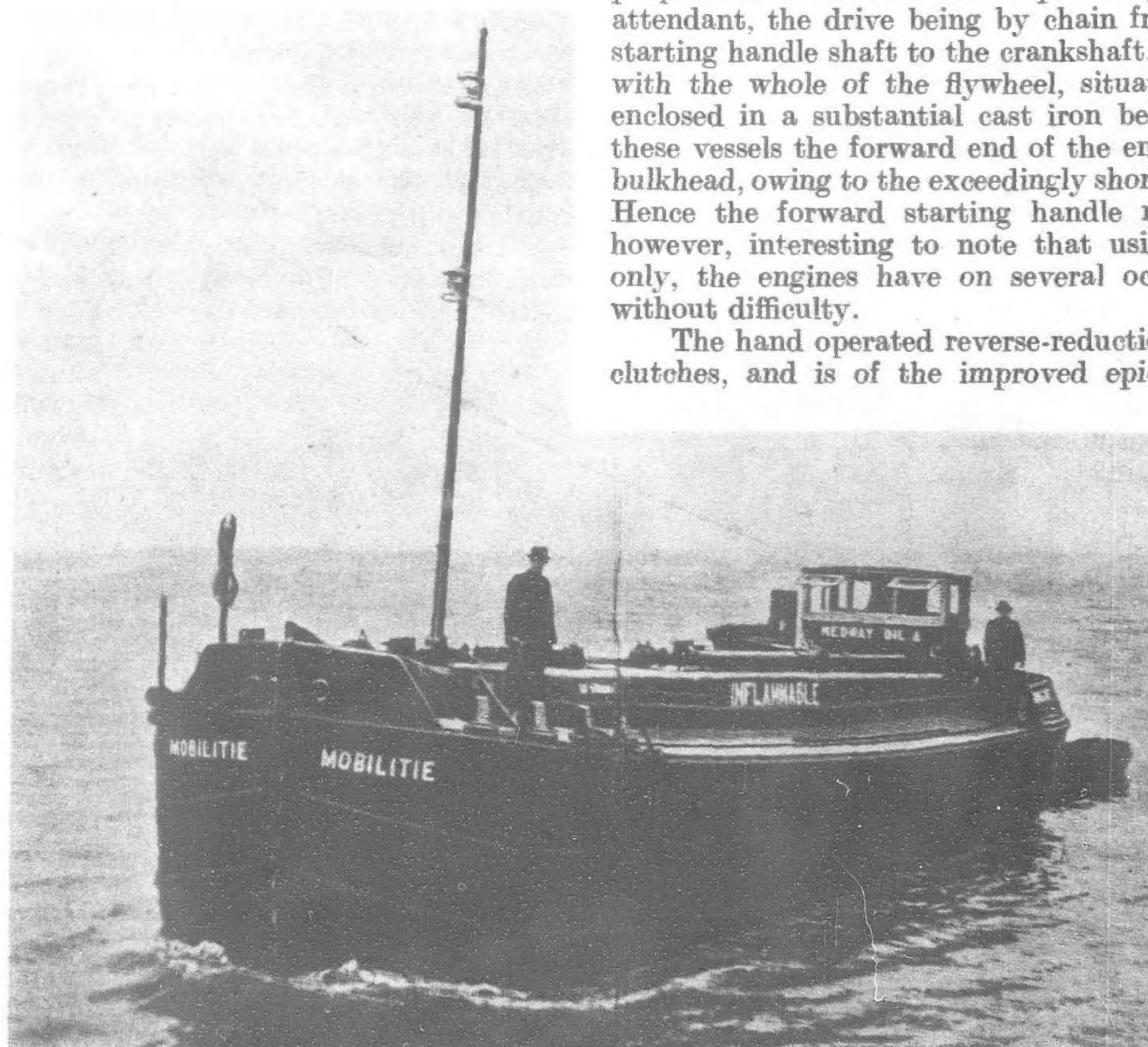
The pressure in the bottle is maintained by a small two-stage air compressor, which is built into the engine, the drive being taken through a dog clutch, which thus enables it to be disconnected when once the requisite pressure has been attained for starting, so that the bottle is fully charged for the next time it may be required.

A handle for initially starting the engine and for emergency purposes is fitted in a raised position, convenient for the engine attendant, the drive being by chain from the forward end of the starting handle shaft to the crankshaft. The chain drive, together with the whole of the flywheel, situated at the forward end, is enclosed in a substantial cast iron bell housing. In the case of these vessels the forward end of the engine is close up against the bulkhead, owing to the exceedingly short length of the engine room. Hence the forward starting handle need not be fitted. It is, however, interesting to note that using the aft starting handle only, the engines have on several occasions been hand started without difficulty.

The hand operated reverse-reduction gear incorporates double clutches, and is of the improved epicyclic type, so constructed that for ahead running a straight through drive is provided. The torque through the reverse gear, however, is not taken through the gear teeth, but is transmitted direct by the clutches. This is a most attractive feature.

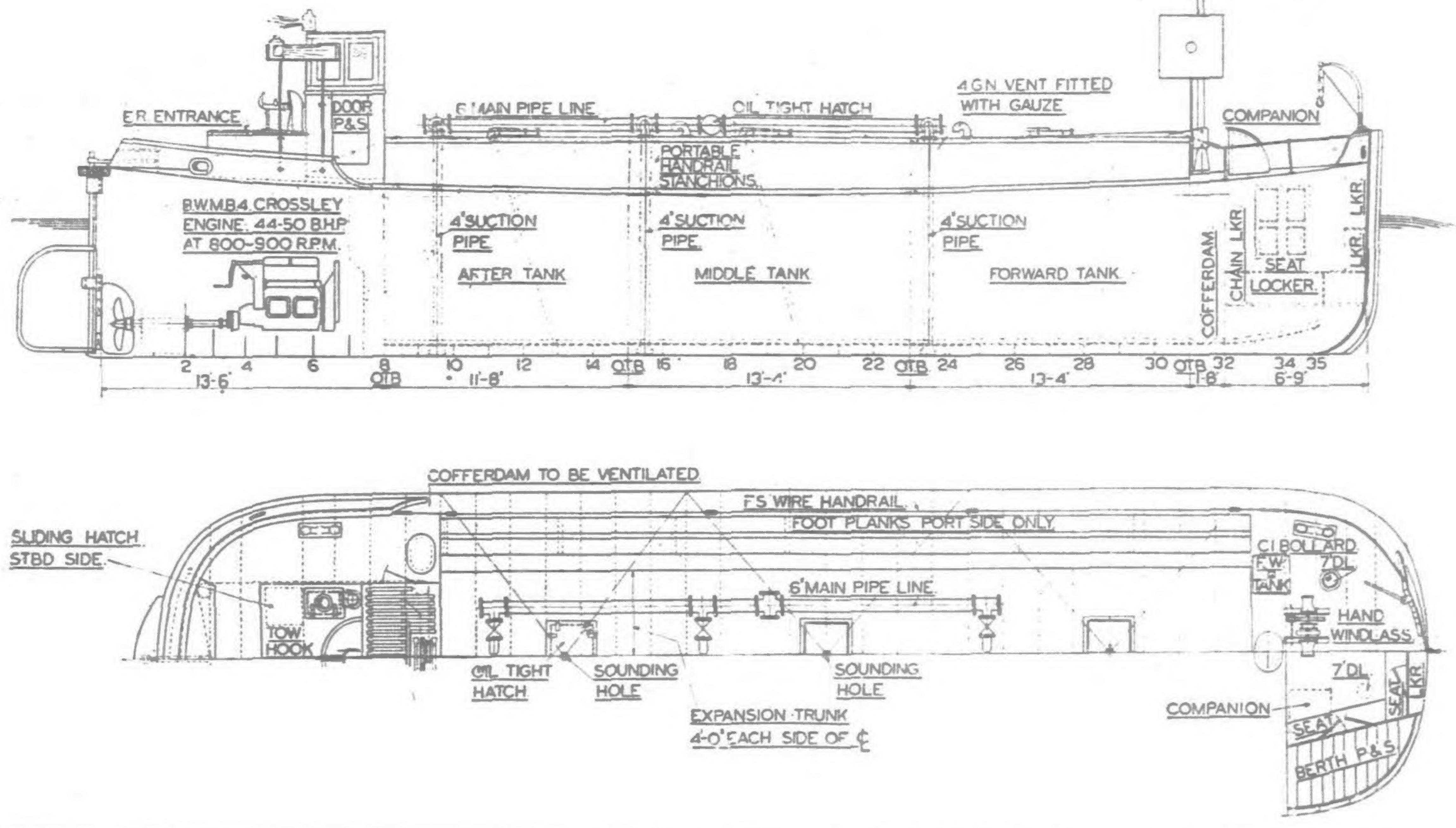
Forced feed lubrication is employed throughout.

In addition to the hand operated reverse gear lever, there is also a small lever which controls the speed of the engine. It may here be noted that this lever controls the speed of the engine through the governor, which actually



The motor tank barge "Mobilitie" equipped with four-cylinder Crossley vertical four-stroke engine

Plan and elevation drawings of M.B. "Mobilite" and M.B. "Tenacite"



regulates the engine speed from "tick-over" up to the maximum speed of 900 r.p.m.

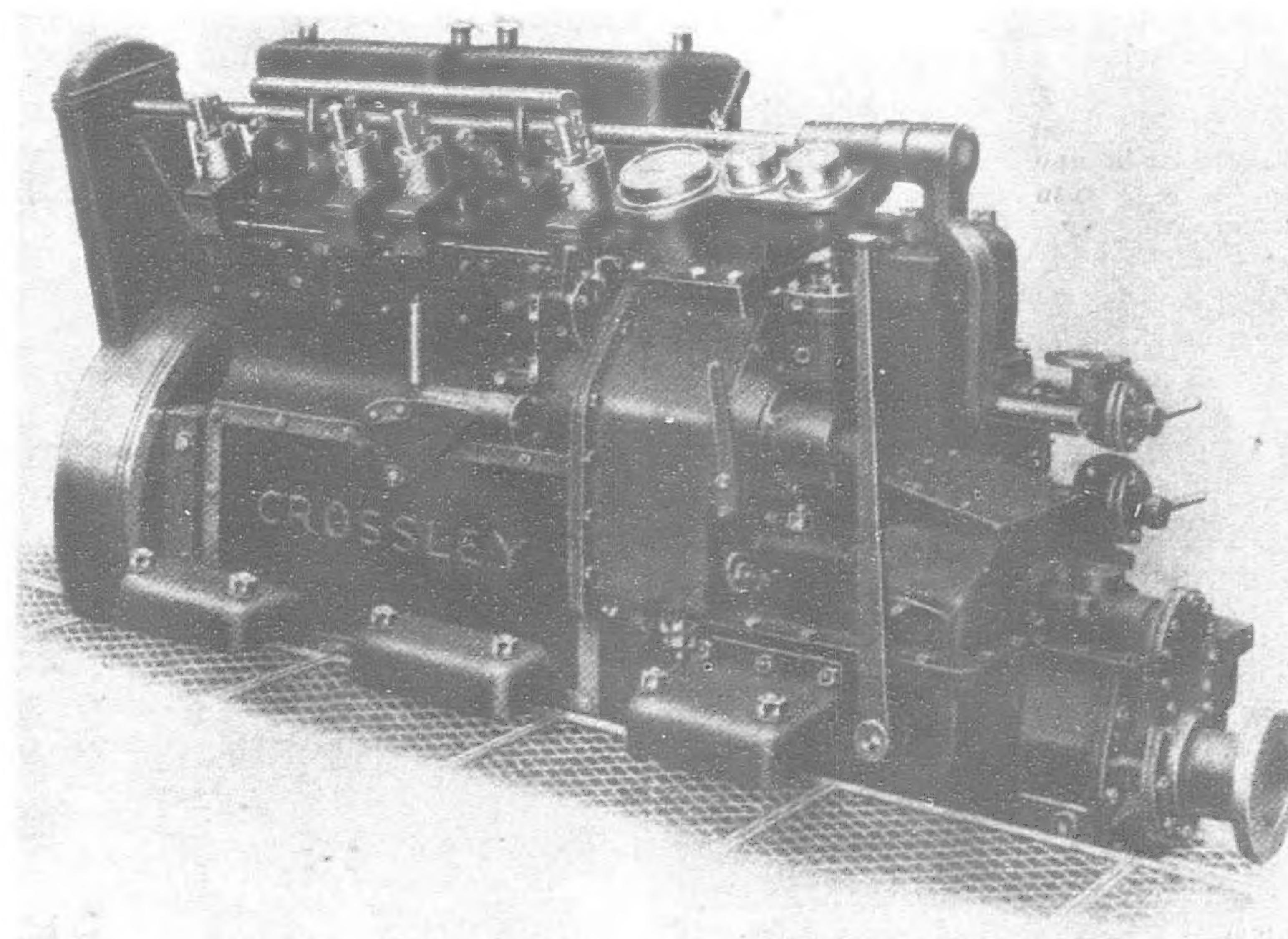
The engine is fitted with an instrument panel, containing a large diameter tachometer showing the engine speed, an oil pressure gauge and a starting air pressure gauge.

Thus it will be seen that the M.B.'s *Mobilite* and *Tenacite* are thoroughly efficient little craft, well equipped to carry out the duty for which they are intended. Moreover they provide interesting and economical additions to the fleet of motor craft owned by the Medway Oil & Storage Co., Ltd.

The Crossley Diesel Engine

The engine is of four-stroke cycle design, self-contained and of simple and robust construction—ideally suited to marine propulsion. Light in weight, and occupying very little space, it is an ideal engine for fixing within an engine room of confined limits. All working parts are enclosed and maintenance presents no difficulty, even to an unskilled attendant. Power ratings, fuel consumptions, etc., conform to B.S.I. Specification No. 649—1935. The standard practice is for the engine to rotate in a clockwise manner when looking forward, and the reverse-reduction gear which is fitted to the engine reverses the direction of rotation so that the propeller shaft rotates anti-clockwise when looking forward. A left-hand propeller is therefore required.

The reverse reduction gear incorporated in the engine is the finest example of its type which it is possible to produce. The standard design is arranged with a 2:1 ratio. Other ratios or a straight through drive can be supplied if required. The whole of the reverse-reduction gear is built into the aft end of the engine and forms a compact and rigid unit. The hand operated type of reverse-reduction gear already described, is thoroughly recommended and



Showing reverse reduction gear and instrument panel mounted at control end

is especially satisfactory in the small sizes under consideration. It is also somewhat cheaper than the alternative type of oil operated gear which, however, is also offered as an alternative for those who may have a preference for this type.

The latter type is of modern design with oil operation and pressure lubrication throughout. It is simple, robust and reliable in working.

The reverse gear and thrust shafts are carried on heavy duty bull bearings. Wear and noise are reduced to the minimum.

The engine controls are arranged on the port side, and the flywheel is situated at the forward end of the engine. The bedframe consists of a rigid casting carrying crankshaft bearings and detachable cylinder liners, and large doors on each side ensure ease of access to connecting rod large end bearings and crankshaft bearings, the latter being carried in the lower portion of the bedframe.

A lubricating oil sump of large capacity is incorporated in the base. The bedframe is extended aft to carry the built-in reverse-reduction gear.

Cylinder heads are simple castings arranged in pairs and singles with valves in renewable guides, and valve rockers in suitable renewable fittings. Efficiently arranged water cooling spaces ensure long life to valve seats. The cylinder head is removed by taking off the holding down nuts and pipes, the joint consisting of a nickel asbestos gasket. The combustion chamber is of the most modern design (Ricardo Patents) and provides exceptionally clean running. Cylinder liners are machined to fine limits from centrifugal castings of highest quality, hardened by a special process, and water-cooled down the entire length. They are interchangeable and easily replaced when necessary. Pistons are castings of light alloy with special scraper rings in addition to gas pressure rings and are accurately ground to size and fitted with floating gudgeon pins.

The crankshaft is of finest quality heat treated high tensile steel, machined all over from a solid forging. A copious pressure feed of lubricating oil is provided for the main journal bearings and crank pin bearings. The shaft can be extended at the flywheel end to accommodate a drive at the forward end if required.

Crankshaft and connecting rod large end bearings are of generous dimensions and consist of steel housings lined with the finest quality heavy-duty white-metal. The connecting rod has a hard phosphor bronze bush pressed into the small end.

The governor is of robust construction, mounted as an enclosed unit adjacent to the chain drive at the aft end of the engine. It is amply powered to ensure steady running under all conditions. The speed is variable from "tick-over" to full speed and the governor is in operation throughout the entire speed range.

The engine is fitted with a special patented design of simple

port controlled fuel pump which means that the only valve in the pump is the non-return delivery valve. The pump is therefore especially suitable for operation at high revolutions, owing to the absence of suction valves and control valves hammering on their seats. It will run for long periods without any attention as (apart from the delivery valve) there are no valve seatings requiring maintenance work. There are two plungers in each pump actuated by a single cam and roller guide. The main plunger has a constant stroke and controls the suction ports, drawing in fuel oil through these suction ports near and at the bottom of its stroke. The control plunger has a variable stroke regulated by the engine governor and determines the duration of injection by by-passing surplus fuel oil through a controlled port back to the suction side of the pump.

The oil seal extends round the complete circumference of the fuel pump plunger, and its length progressively increases as the plunger moves towards the upper end of its stroke.

The pump is less sensitive to wear and to the presence of foreign matter than other types of pumps, and generally gives a superior performance. It enables the engine to develop a larger horse-power combined with reduced fuel consumptions and improved governing properties.

When the time comes to replace worn parts, this can easily be done in the "Crossley" Patent Pump. The plungers and detachable guides do not require any special skill in their removal and renewal.

LUBRICATING OIL SYSTEM.—A positive action gear pump supplies lubricating oil to the engine and reverse gear under pressure.

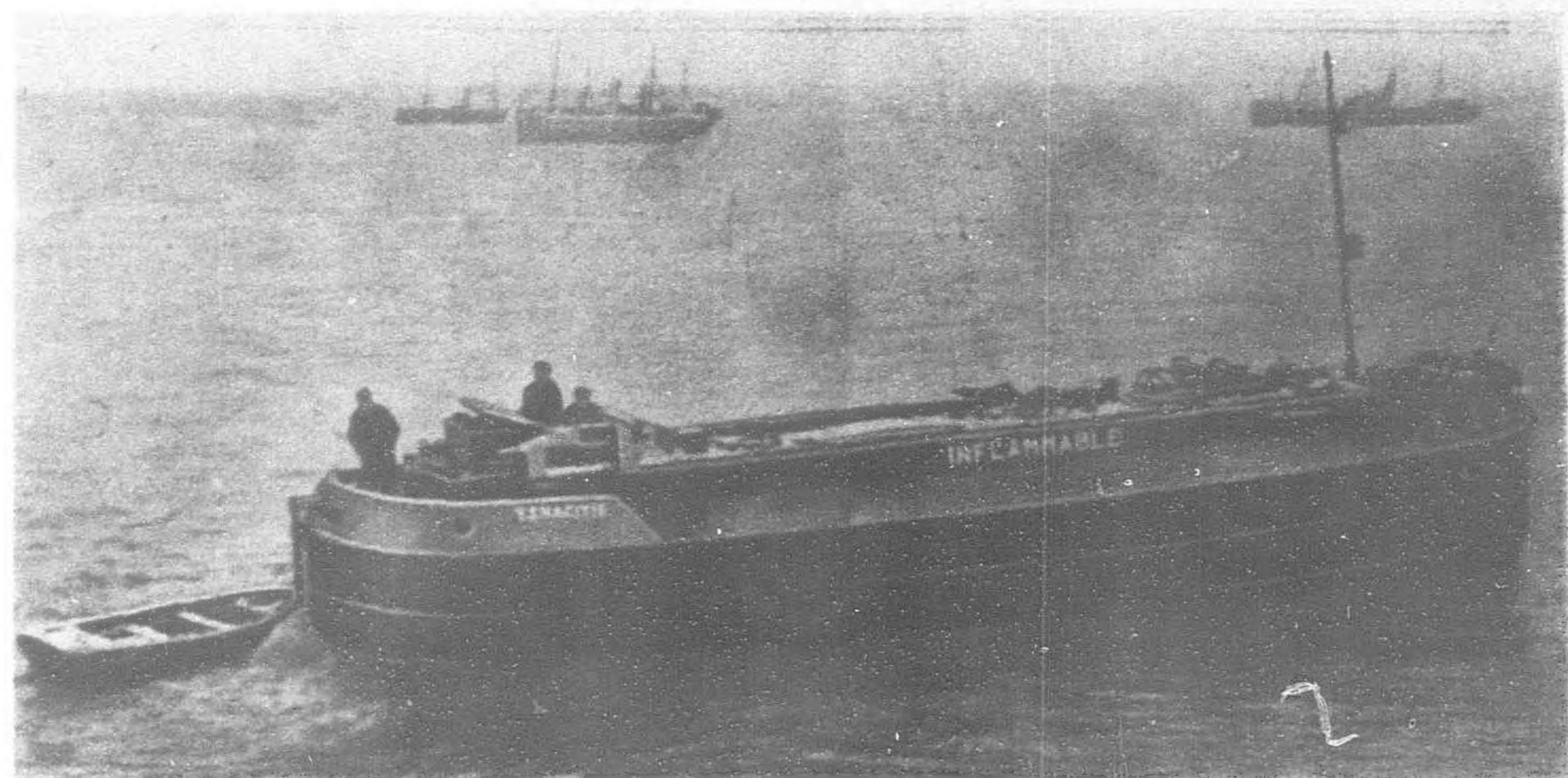
It is accessibly located vertically below the aft end of the camshaft low down on the engine, in such a position as to be "drowned" with lubricating oil. It can be removed externally from the engine without dismantling any other parts.

The oil is drawn from the sump strainer, situated at the base of the bedframe, and is delivered from the pump to an Autoklean strainer and thence to an oil manifold on the back of the crankcase.

Separate branch feeds are taken from the manifold to each main bearing and oblique drillings in the crank webs also supply a copious feed of oil under pressure to the large end bearings. A further feed is taken through the hollow camshaft to the camshaft bearings, valve rocker gear and an oil spray is played on to the duplex chain driving the camshaft and governor. In addition to this the camshaft also runs in an oil bath. The reverse gear is also lubricated under pressure from the main system. A separate oil bath is provided for the helical spur reduction gearing, and is totally enclosed.

A spring loaded oil pressure regulator is built into the engine.

The lubricating oil, after passing through the various engine parts, finds its way down into the engine base, which incorporates an ample capacity of sump and is fitted with a large detachable



A view of the motor barge "Tenacitie"

strainer, which constantly filters the oil as it circulates round the engine. The lubrication system has been so designed that it allows the engine the maximum inclination to the horizontal without being adversely affected.

Connecting rods are drop forgings of heat treated high tensile steel with a hard phosphor bronze small end bush.

Bearing shells lined with special heavy-duty alloy metal are fitted to the large end and can be readily adjusted for wear. The materials used result in minimum wear of the crankshaft—an important point in high speed Diesel engines.

The camshaft is carried in the bedframe near the top of the engine and is driven by means of a duplex roller chain. The camshaft runs in an oil bath. In addition a forced feed is taken to every bearing. Hardened steel cams operate the valve rockers through enclosed tappet rods. The valve operating mechanism is light, compact and silent, owing to the short length of the push rods.

The fuel pump cams are situated directly underneath the fuel pump rollers and guides. The tension of the chain driving the camshaft is maintained by means of an automatic self-adjusting tensioning device.

The flywheel is of the disc type, balanced and machined all over to ensure smooth running of the engine, even down to low idling speeds.

Water circulating and bilge pumps are interconnected and interchangeable, of ram type, and are fitted near the after end and operate at half engine speed. They are mounted side by side in a vertical position at the back of the engine and form a compact and accessible arrangement. Bronze plungers operate in bronze sleeves reducing wear to a minimum. The pumps are lubricated by an ample supply of oil from the main system. The operating mechanism is totally enclosed yet instantly accessible. The bilge pump drive incorporates a dog clutch so that it can be cut out of operation when not required. Either pump can be used for circulating cooling water through the engine.

A large size water jacketed exhaust manifold is supplied as standard.

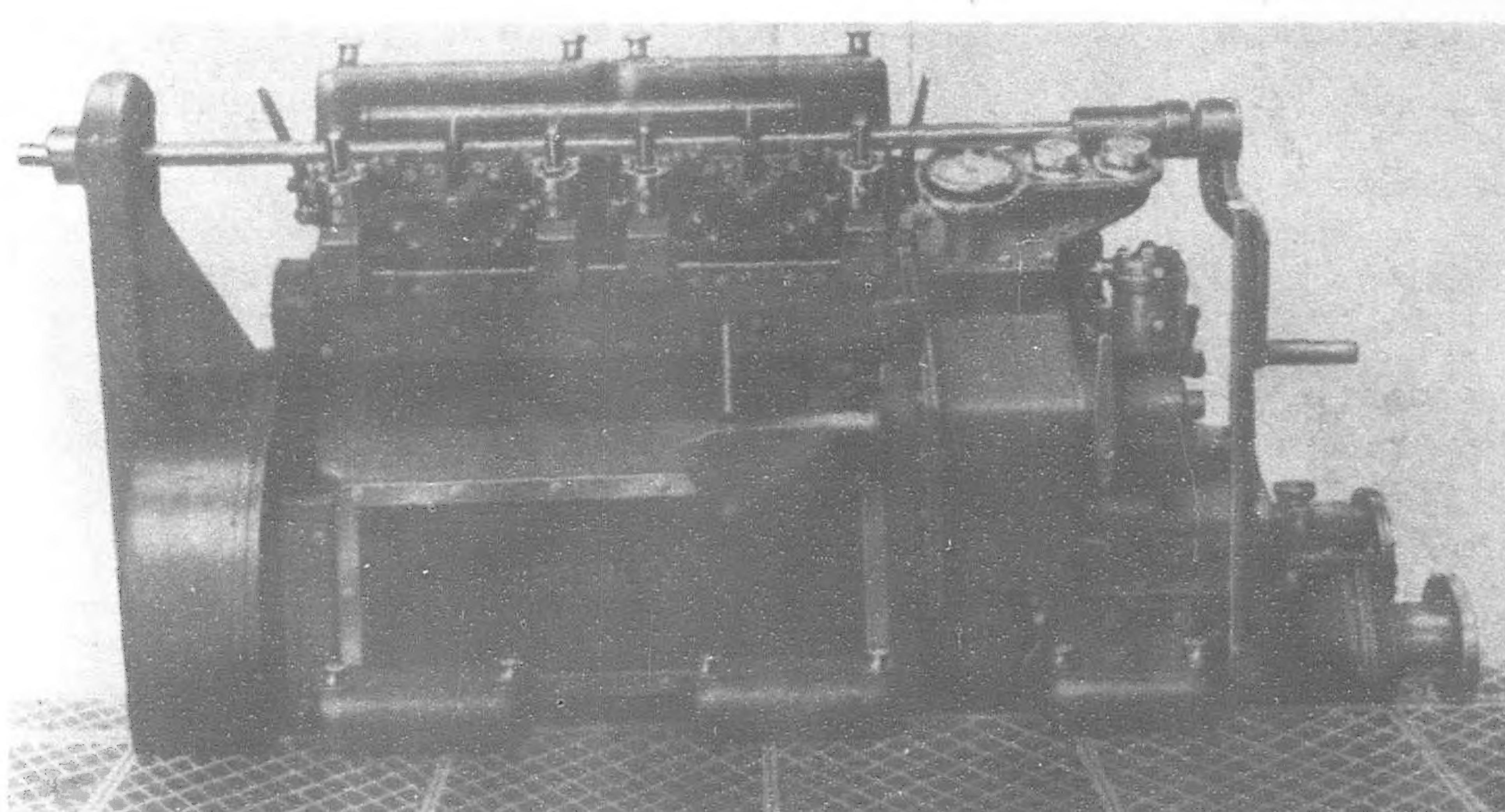
A thermometer for measuring exhaust gas retemperature at the outlet of the manifold is provided. Thermometers can be fitted to each cylinder outlet as an extra.

Suitable silencers are supplied as standard for both air intake and exhaust.

In place of the standard tubular type exhaust silencers, a water jacketed box of large dimensions or a water injection type of exhaust silencer can be supplied where the piping layout can be suitably arranged. This arrangement is recommended where the exhaust is taken out aft through the skin of the vessel.

For an extra degree of quietness special silencers of both air and exhausts can be supplied.

Water spaces are ample and free circulation is ensured. Great care has been exercised throughout to avoid trouble due to corrosion. Zinc plates are fitted to the water jackets and water pumps.



Front view of Crossley four-cylinder 50 b.h.p. diesel engine as installed in the "Mobilite" and "Tenacitie"

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